

Full Throttle



REVIEWS

- *The Jet Age*
- *WinPlanner Plus*
- *AETI Flight Yoke*
- *Scenery Canada*
- *Scenery San Diego*
- *Real ATC*
- *GPS 98*

Scenery Design Corner

April/May 1998
Volume 5 Number 2
USA \$7.95

Panel Design
"How To Guide"

52 27

Flying The F-16
A Ride in the Simulator

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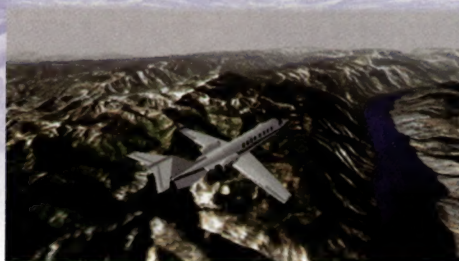
NOTAMs: New Products

For those of you who aren't familiar with the term, NOTAMs is an acronym for NOTices to AirMen. The U.S. Government issues NOTAMs on a regular basis. This issue marks the launch of our version of NOTAMS — an expanded new products section. It will be a regular part of our magazine. The products listed are compiled from press releases and information provided to us by the respective authors and companies who supply the products. We've taken steps to verify the information with each author or company, but cannot be responsible for inaccurate features, specification or availability dates.

MegaScenery

PC Aviator, the major software publisher based in Melbourne, Australia, is readying its newest add-on for Microsoft **Flight Simulator**. Their upcoming **Pacific Northwest** scenery covers a 75,000 square mile area in the states of Washington and Oregon and British Columbia, Canada.

According to producer Robert Ferraro, their MegaScenery technology is developed from satellite photography and produces resolution to 30 meters per pixel at high altitudes. For major cities, the resolution increases to five meters per pixel.



Pacific Northwest	
For Microsoft FS 5.1, FS95 and FS98	
SRP:	\$49.00
From:	PC Aviator 219 Balacava Road Suite 6 North Caulfield, VIC 3161 AUSTRALIA
Phone:	+ 3-9532-8258
Fax:	+ 3 9532-8916
http://www.pcaviator.co.au	
E-mail:	crew@pcaviator.com

Pacific

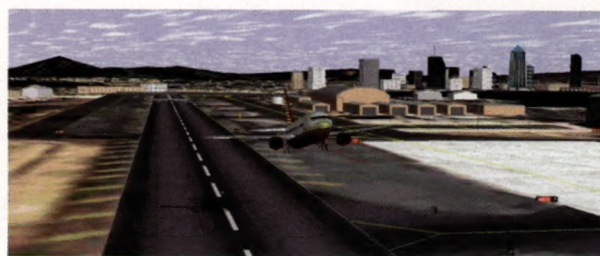
Northwest includes noted landmarks such as Lake Chelan, Mt. Adams, Mt. Hood, Mt. Olympus, long stretches of the Columbia River and the Pacific coastline and the infamous Mt. St. Helens.

Available third quarter, 1998.

Safari Fliteware New Release

The team at Safari Fliteware has released their 12,000 square mile **Scenery San Diego**. It covers an area stretching from the Pacific east to the Imperial Valley and from the Mexican border north to adjacent counties.

The scenery includes many of San Diego's famous landmarks, such as Sea World, Torrey Pines golf course, Palomar Observatory, Coronado Bridge, Mission Bay and the 27 airports, desert strips and military bases, all in high-resolution detail based on aerial photos.



Scenery San Diego	
For FS5.1, FS95 or FS98	
SRP:	\$39.95
From:	Safari Fliteware PO Box 274112 Tampa, FL 33688
http://www.fliteware.com	
E-mail:	info@fliteware.com

A New Aircraft Manager: Presenting PFC 98

Guy LaRochelle is readying a new version of his popular **PreFlight Center** shareware package for FS98. Dubbed "PFC98," this flight-management utility lets you mix and match aircraft, panels, sounds and flights.

The beauty of **PFC98** is the ease with which you interact with this utility.

It's almost all point and click. One especially powerful feature is its ability to manage and organize your aircraft, panels, gauges, etc. By centralizing this information, PFC98 lets you eliminate duplicates. Using this feature, you can save lots of hard disk space if you have many aircraft installed on your FS98 system.

PreFlight Center 98	
For Microsoft FS98	
Shareware:	\$15.00
From:	Guy LaRochelle
http://pages.infnit.net/preflct/sigr/sigr.htm	
E-mail:	preflct@videotron.ca

Gauges Anyone?

Bruce Hellstrom's **GaugeDump** is a new panel utility for designers who want to get at the internals of FS98's instruments.

Using **GaugeDump**, you create a "C" language source file containing the code and bitmaps used by the gauge. You can then examine and modify any of the drawing elements to change and enhance the look and operation of the instrument.

If you're looking to dissect and revamp panels, this utility and Microsoft's Panel SDK will help you get there.

GaugeDump	
For Microsoft FS98	
Shareware:	\$20.00
From:	Bruce Hellstrom
http://www.pacificnet.net/~bruceh/gaugedump.html	
e-mail:	bruceh@pacificnet.net

The Flight Crew Welcomes You Aboard

Lago, of Como, Italy, and The Associates, of London, England, have teamed up to form a new company—The Flight Crew. Their first project is **Flight Essentials**—a new series of low-cost add-ons for Microsoft Flight Simulator.

The initial titles include:

- ➔ Airbus 98—44 models
- ➔ DC-3—10 models
- ➔ Scenery Venice 98
- ➔ Scenery Singapore
- ➔ Scenery Vienna

Each title is priced at about \$20 US, or £14.99 GBP. The first titles were scheduled to ship during March with others following shortly thereafter.



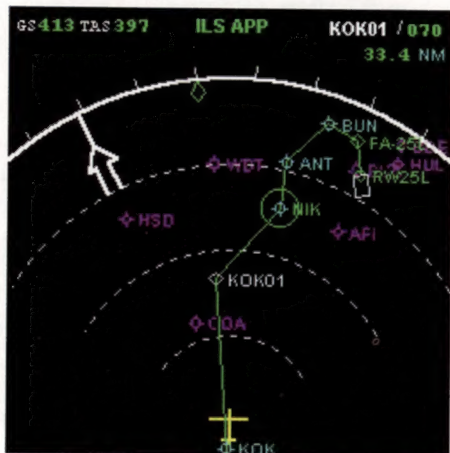
Flight Essentials	
For Microsoft FS51, FS95 and FS9	
SRP:	\$20 US or £14.99 GBP
From:	The Flight Crew C/O Interactive Associates Ltd. Unit A2/A3, Edison Road St. Ives Cambs. PE17 4LF United Kingdom
Phone:	+44 1494-511103
Fax:	+44 1494 511104
http://www.lagoonline.com	
E-mail:	cr roger@theassociates.co.uk

EFIS Version 2

Shareware author Chris Brett has announced the latest release of EFIS v2.0.

Electronic Flight Instrument System adds a "glass cockpit" moving map navigation display and flight management system.

Chris has patterned his EFIS around the Airbus 320 and concentrated on making it easy to use. EFIS can be combined with the autopilot and controls speed, altitude and heading along the entire flight route.



EFIS v2.0	
For Microsoft FS98	
Shareware:	\$25.00
From:	Chris Brett
http://www.formulate.clara.net/	
E-mail:	efis@formulate.clara.net

South of the Border

FlyMex has announced the March release of **Mexico Scenery Gold**. It includes more than 150 airports and all VOR, ILS and NDB nav aids. More than 100 adventures are also included in both English and Spanish.

In addition, the users guide has 30+ approach charts for major airports.



Mexico Scenery Gold	
For Microsoft FS95 and FS98	
SRP	\$35.00
From	FlyMex Blvd Avila Camacho 291 Mexico DF 11220 MEXICO
Phone:	+525 557-8652
Fax:	+525 822-5421
http://www.interflow.com.mx/flymex	
E-mail:	flymex@interflow.com.mx

WWI Excitement

How about a journey into the past, when flying was new and airborne combat a learning experience? Empire Interactive's **Flying Corps Gold** puts you into the seat of famous World War I fighters such as the Fokker DRI, SE5a, Sopwith Camel and Spad XIII, where you'll learn to fly from the seat of your pants.

Since FCG supports major 3-D video cards that use Direct 3D, the detailed scenery and textures appear smooth. Multiplayer has been added using DirectPlay. You can position aircraft, tanks, artillery, buildings and other objects with the Mission Editor.



Flying Corps Gold

For Windows 95

SRP: \$44.95

From: Empire
580 California Street, 16th Floor.
San Francisco, CA 94104

Phone: 415-439-4854

Fax: 415-439-4928

<http://www.empire-us.com>

Fly South for the Season

Playsoft of Bogota, Colombia, has released their scenery of the Andes in **South America**. This package covers the Andes in Ecuador, Peru, Bolivia, Chile, Argentina and Antarctica, a huge 1.3 million square mile area.

This extensive scenery area has all of the navigation aids contained in the Jeppesen charts. Playsoft says that this is the first in a series of scenery for South America.



New Version of iF-22

Interactive Magic announces Version 5 of its **iF-22** Raptor for April. The new release features IM's TALON (Total Air & Land Operations Network), which puts the pilot into a world of hundreds of allies and opponents all ready to do combat but never on the same game twice.

New to this version are weapons with artificial intelligence, giving your allies and enemies more smarts. New campaigns are made from real satellite



images of Kuwait, Iraq and Iran. **iF-22** supports computers using the new AGP (Accelerated Graphics Port).

iF22 Version 5

For Windows 95

SRP: \$39.95

From: Interactive Magic
PO Box 13491
Research Triangle Park, NC 27709

Phone: 415-439-4854

Fax: 415-439-4928

<http://www.empire-us.com>

Scenery South America-Andes

For Windows 95

SRP: \$39.95

From: Playsoft
Carrera 20. No. 39-331
Oficina 201
Santafe de Bogota, COLOMBIA

Phone: +571-338-30942

Fax: +571-245-3956

<http://playsoft.com.co>

e-mail: playsoft@multi.net.co

Flying The F-16

**By Jim Rhoads
with Major Jeff Traver**





I am sure every red-blooded American boy has dreamed of being a jet fighter pilot. I remember playing in the back yard with my buddies and suddenly being shaken senseless by the sound of a military jet breaking the sound barrier. Although petrified for a moment, our faces would turn from sheer shock to jealous little grins with the thought "I am going to do that some day." Sadly, that dream never came true for me. However, Major Jeff Traver never lost sight of his goal.

Jeff Traver began flying lessons when he was 15 years old, in 1977. He received his Private Pilot certificate at 17. He then went on to college at Indiana State University in Terre Haute, Indiana, with a major in aerospace technology. At ISU he received his CFI, CFII, MEI and MEII. He also attended USAF ROTC all four years of college and earned a pilot slot his sophomore year. Major Traver graduated in May of 1984 and began UPT (undergraduate pilot training) in October 1984. For one year he flew T-37s and T-38s, graduating number two in his class of 40, and was given the job of flying the F-16 at Hill Air Force base. Major Traver stayed at Hill AFB for four years, qualifying as a second lieutenant at the whopping age of 24 years old. While there he trained in Maverick, air to air and air to ground, and he was one of the few first lieutenants to be a four-ship flight leader. Leaving Hill AFB, Major Traver was sent to Kunsan AFB in Korea. He spent a year there working CAS (Close Air Support) with the Army in P518 (which is the buffer zone between North and South Korea), again concentrating on maverick, air to air, and air to ground. Leaving Kunsan, Major Traver spent two and a half years at Luke AFB as a LANTIRN instructor (Low Altitude Night Tactical Infrared Navigation). Leaving the Air Force full time, Major Traver joined the Indiana National Guard, where he is currently on guard with the 163rd fighter squadron "Black Snakes" unit in Ft. Wayne.

The Virtual Viper

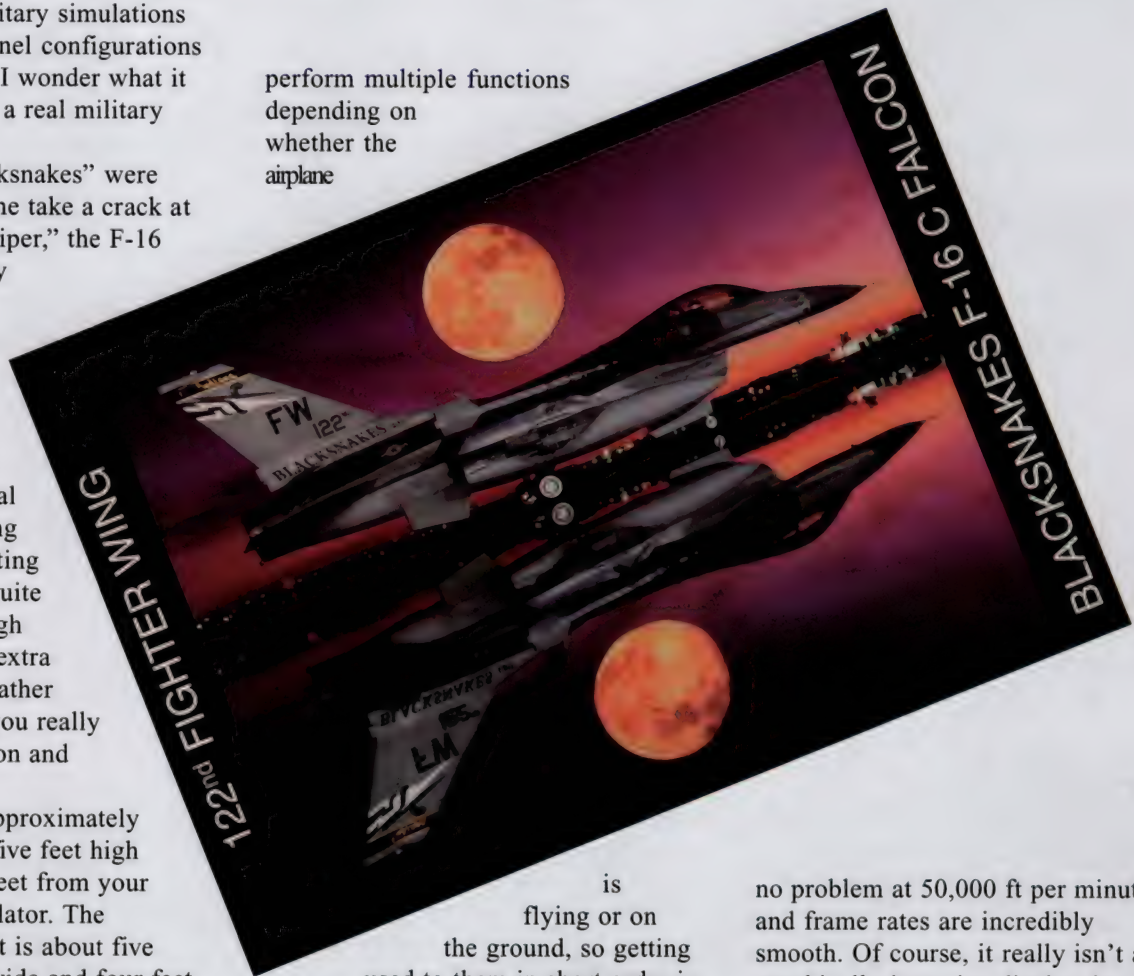
Have you ever been flying in one of your favorite military simulations or military plane panel configurations and thought, "Man, I wonder what it would be like to fly a real military simulator?"

Well, the "Blacksnakes" were kind enough to let me take a crack at flying the "virtual viper," the F-16 simulator commonly referred to as "the sweat box." The sim itself is an actual cockpit mockup with all the hardware you would find in the real F-16, with everything fully functional. Sitting in the simulator is quite comfortable, although there is not a lot of extra room anywhere. It rather cradles you in and you really feel like you slip it on and become part of it.

The screen is approximately seven feet wide by five feet high and sits about five feet from your position in the simulator. The computer that runs it is about five feet high, two feet wide and four feet deep. The scenario presented when the sim boots sets you on a mockup of runway 05 at Ft. Wayne, with some generic buildings and hangars, which are very much reminiscent of Microsoft's *Flight Simulator* stock buildings. Terrain scenery is actually quite bland and kind of looks like a muted FS prairie tile with lots of small rolling hills and a few large ones. The sky and cloud scenery looks very realistic, and the colors are more natural than anything I have seen in any simulator.

If you are a button freak, then the F-16 simulator is for you. The F-16 is a totally "hands on" airplane. Most (if not all) critical functions are controlled on the throttle or stick via buttons, hats and switches. Some

perform multiple functions depending on whether the airplane



is flying or on the ground, so getting used to them in short order is asking a lot. I was very surprised to see what little input was required to control the plane. I don't believe the stick travels more than 1/4 inch in any direction. However, it didn't seem too sensitive, just tight and agile.

Ok, so here I am sitting at runway 05 ready for departure. Major "Jethro" Traver and Major "Boo" Bouillion setup all the appropriate switches and hardware before departure and gave me the good-to-go sign. Full throttle to mill power, then push the throttle left and full forward to AB (after burner). Climb 12 degrees nose high. I followed orders at that configuration for a few minutes, until much to Boo's surprise I did a couple snap rolls and an Immelman. Climbing in the F-16 is

no problem at 50,000 ft per minute, and frame rates are incredibly smooth. Of course, it really isn't a graphically intensive display, but for navigation, system failure and hostile aircraft situations, it really doesn't have to be. Sitting in the F-16 cockpit is an awesome feeling, and to tell you the truth, I really didn't want to get out of it. Even after one hour in the sim, I just hated to give it up. At a price tag of one million dollars for the simulator that I tested, I am still trying to figure out a way to justify to my wife why we need one. The only thing I could find fault with the sim was that it had no beer holder or pretzel bag racks. *Full Throttle* will soon be visiting with the Blacksnakes again to spend a little more time with them and the "virtual viper." And by the way, I landed it first time!

Jim Rhoads



Indiana. Major Traver now has 14 1/2 years in the military and 12 years and over two thousand hours in the F-16.

A typical day in the "Viper"

"Although the Air Force deems the name for the F-16 as the Fighting Falcon," says Traver, "the pilots refer to them as the 'Viper,' after the enemy ships in the original movie *Battlestar*

Galactica." When Traver is not flying a Boeing 757 for United Parcel Service, you can bet he will be heading for the 163rd wing to fly the Viper. A typical day flying the Viper starts at 5:30 a.m., driving about one hour to Ft. Wayne. Traver begins his routine by checking the mission he is "fragged" for (assigned to), air to air or air to ground, and checking the weather NOTAM (Notice to Airmen). Flight scenarios are typically based in southwest Asia, designed to be as realistic as possible. This insures the training is kept at a high level. A typical air-to-air ride involves four blue air (good guys) and 2 to 4 red air (bad guys). Traver says, "As the flight lead, I'll coordinate the four ship and cap a simulated airfield defending a certain lane coming into the airfield. Then the reds will be adversaries simulating Iraqi fighters heading north or south into the no-fly zone, depending on the scenario. Then we try to identify them and use good tactics to destroy them and not us...Air

to ground is basically the same situation, except the strategy being geared more toward destroying an airfield." After completing the mission, the "Black Snakes" return to Ft. Wayne and debrief for an hour and a half to two hours. They will then go over everyone's flight to see what they did right and what they did wrong and try to learn from any mistakes that were made.

In the saddle...

Flying the F-16 is not quite as easy as just jumping in and lighting the burner. "After the briefing and before flight, we have to go through what we call life support," explains Traver. "It's where we keep all the harnesses for the parachute, our 'G' suit, our combat edge and our helmet." The "G" suit looks kind of like the chaps that cowboys used to wear; it goes around your waist and legs, then hooks into the jet. Combat edge is an air bladder vest like the "G" suit, which also hooks into the jet. Traver adds, "As you pull Gs, the 'G' suit automatically inflates to help keep the blood from pooling in your legs and buttock areas and keeps the blood level above the eyeballs and brain. Combat edge helps do the same thing by keeping all the blood pushed up into your head." Have you ever heard a fighter pilot grunting when he is making radical turns? That is called an "L1 maneuver." By doing this you push the blood pressure up, which keeps the blood above eye level. When blood starts to vacate the brain and it goes below the optic nerve, you start to gray. As it goes farther and farther away from the optic nerve, you start to lose more vision, beginning with tunnel vision and a sparkly look to losing all vision but remaining conscious. The moment that you let off of the Gs, the suit, combat edge and L1 maneuvers will start to bring the blood level back up to the optic nerve and your vision generally comes back very rapidly.



It is also possible to do what is called a "G" lock, which is loss of consciousness. Traver states, "If you snap the Gs on real quick, an F-16 will give you nine Gs in half a second if you ask it to. At nine Gs the average head, weighing at 20 pounds, now becomes about 180 lbs. Add a two-pound helmet and now you have 198 pounds." Traver mentions that flying the F-16 is incredibly easy, probably even for a non-pilot who knows a little bit about airplanes. Flying the airplane is just expected. Traver says, "What is a true measure of a good fighter pilot is: can he employ it as a weapon? After all, it's just an airplane, but when you strap missiles, radar and other capabilities, we are more concerned about using it as a weapon." Traver feels that flying the F-16 is the greatest thing he could have achieved in his life. He met all his goals in his military career by being able to stay in the airplane and being reasonably comfortable with his skills. Traver feels he can do virtually any mission in this airplane and do it well. "The day I quit flying the F-16 will be a shame, and a sad one as well," says Traver. "The satisfaction of flying the airplane is to go out there, brief it well, execute your plan and get the kill ratio you're looking for by destroying the target totally. You want to get the probability kill high enough so that no one else has to go back in and do the same thing you were sent in to do. Then, being able to go back, debrief it and be able to reconstruct it where everyone understands it. Those are the best and most rewarding things to me about flying the F-16."

Requirements...

What's required to fly the F-16? It starts in high school. You have to study. You need math and science. The Air Force likes to see sports activities because it is a command structure. Traver states, "Especially to the younger audience, to be a fighter pilot

YF-16 Prototype

General Dynamics built two YF-16s. The goal was to simplify maintenance with easily removable access panels, and several built-in test systems were installed to pinpoint inoperative components.

The first YF-16 was finished in a red/white/blue camouflage scheme, and the second was finished in a cloud-white and light-blue camouflage.

Phil Oestricher, a General Dynamics test pilot, was the first man to fly the YF-16.

The two prototypes made many test flights for speed, maneuverability and mid-air refueling. They also tested what weapons should be carried by the YF-16. Typically, sidewinders were selected.

The F-16A

In 1975, after the many successful tests of the YF-16, General Dynamics was awarded a \$417.9 million fixed-price incentive contract to produce 15 F-16s—eleven single-seat F-16As and four two-seater F-16Bs. A cost of \$4.6 million per plane was projected for each of the 650 production aircraft ordered for the USAF.

Weapons

The F-16 was originally designed as an air-to-air fighter, so it was only intended to carry a gun and sidewinder AAMs. The F-16's design was found adaptable to the more advanced air-to-air weapons and a variety of air-to-ground weapons.

It has retained the M-61A1 Vulcan 20mm cannon with double-ended linkless feed system having a capacity of 500 rounds and a firing rate of 6,000 rounds per minute. There are also

provisions for external stores, including nine store stations for launchers, and pylons to attach missiles, fuel tanks, bombs, electronic countermeasures (ECM) pods, dispensers, or even a nuclear device. In its present form, the F-16 is one of the most potent air-to-air combat fighters ever flown.

Also introduced to the F-16 was the APG-66 Radar system and the AMRAAM (Advanced Medium

Range Air-to-Air Missile), which gives the pilot beyond visual range capabilities. For its small size, the F-16 packs a powerful punch in the air-to-ground role. With the same payload, the F-16 has more than twice the range as the F-4 Phantom. 12,000 pounds can be carried by the F-16 with full internal fuel.

Switches on the throttle, side-stick controller and radar control panel allow the pilot to change radar modes quickly without having to take his eyes off the target, so that he can maneuver into firing position.

F-16 Specifications

Power plant:

One Pratt & Whitney F100-PW-200 turbofan rated at 23,840 lb st (10,809 kph) with full afterburning and approximately 15,000 lb st (6,805 kgp) without augmentation.

Fuel capacity: 1,072 US gallons (4,060 l) in F-16A, 889.8 US gallons (3,368 l) in F-16B, plus provision for a 300 US gallons (1,136 l) tank on fuselage center line and two 370 US gallons (1,400 l) tanks under wings.

Performance:

Max speed (with wing-tip sidewinders): 1,350 mph (2,170 km/h) at 40,000 ft (12,190 m) or Mach=2.05, and 915 mph (1,472 km/h) at sea level or Mach=1.2

Tactical radius (interdiction mission HI-LO-HI on internal fuel with six 500-lb (227-kg) MK 82 bombs): 340 mls (550 km).

Weights:

Operational empty: 14,567 lb (6,613 kg)

Max take-off (air-to-air missions, wing-tip missile only): 23,300 lb (10,570 kg)

Max take-off (interdiction mission): 35,400 lb (16,060 kg) up to Block 20 and 37,500 lb (17,010 kg) for Block 25 aircraft.

Dimensions:

Span: 31 ft, 0 in (9.45 m) without missile; 32 ft, 10 in (10.01 m) over wing-tip missiles

Overall length (excluding nose probe): 47 ft, 7.75 in (14.52 m)

Height: 16 ft, 5.5 in (5.01 m)

Aspect ratio: 3-0:1

Dihedral: nil

Undercarriage track: 7 ft, 9 in (2.36 m)

General Dynamics F-16C Fighting Falcon

Manufacturer:	General Dynamics	
Designation:	F-16	
Version:	C	
Type:	Fighter	
Crew:	Pilot	
Specifications		
Length:	49' 3"	15.01 M
Height:	16' 3"	5.08 M
Wing span:	31' 0"	9.45 M
Wing area:	300.00 Sq. Ft.	27.87 Sq. M
Empty Weight:	19100.00 lbs.	8662.00 Kg
Gross Weight:	21585.0 lbs.	9789.00 Kg
Max weight:	25971.0 lbs.	11778.0 Kg
Propulsion		
No. of Engines:	1	
Power Plant:	General Electric F110-GE-100	
Performance		
Max Speed:	1320.00 MPH	1148.65 Kt.
Climb:	50,000 Ft/min	15239.3 M/min

Armament:

One General Electric M61A-1 Vulcan 20-mm multi-barrel gun port wing/fuselage fairing, with 515 rounds.

Up to 12,000 lb (5,443 kg) of external ordnance on nine stations, including wing tip AAMs.

The F-16B

The F-16B retains most of the dimensions of the F-16A, except for the range. The B loses 1,200 pounds of internal fuel capacity because of the second seat. The antenna pods were fitted on the wingtips in place of the AIM-9 missiles.

The F-16C & D models

The F-16C & D models are just powered-up versions of the F-16A & B models, with a few other minor differences. The C & D models' major changes are in the cockpit layout and hardware/software enhancements. These were the first cockpits designed by pilots for pilots.

The F-16XL

The F-16XL, or "F-16E," is a new version under development at General Dynamics. It is also known as Supersonic Cruise Aircraft Modification Program, or SCAMP. It is a delta-wing version of the F-16

with a wing area (compared to the original F-16) enlarged by 115%. The increased wing area allows increased fuel capacity and/or increased payload. The F-16XL will be able to take off and land in two-thirds of the distance required by the F-16A. It will be capable of speeds 90 knots greater than the F-16A at sea level and will have a 125% greater range than an F-16A with the same payload.



in any branch of the services, you must have a spotless record. Got a drug record? Forget it. Because for every one person that has a blemish on their record, there are a thousand who do not." You may have a blemish on your record and be the one that has the "golden hands," but the person that does not have a record and has a pair of Hormel hams on the end of his arms may be the one that gets a shot at a pilot slot and ends up being a fighter pilot. Although you might have been another Chuck Yeager, you made a costly mistake that can forfeit your dream."

Another requirement is you need to go to college. To be an officer you need to have a four-year degree and attend UPT. If you are selected as a fighter pilot candidate, you will more than likely be flying T-38s. Once assignment night arrives, you fill out a "dream sheet" where you list all of the fighters you would like to fly. Based on how many come down the assignment chain and how well you do in your class, the better the chances of getting your first choice are. Now, once you are in the airplane, you have to continue to excel. You have to work hard at what you do; you have to show a good attitude. If you are able to do those things and continue to improve as well, chances are you will stay in the F-16. The Air Force doesn't tolerate fighter pilots with attitudes that project "I have arrived," Traver says. "If you have that kind of attitude, the Air Force will send you back to UPT and find you a job as an instructor or flying some other kind of hardware, because you have to stay sharp and focused to be an effective fighter pilot."

Flying Iraq

Major Traver and the Ft. Wayne "Black Snakes" spent time in Iraq this summer defending the no-fly zone. Looking back, he shares his thoughts. "Kuwait itself is a very desolate area, and flying there you encounter high

temperatures, high gross weights, and the plane doesn't perform well. Normally, in the States, you can expect a three thousand-foot take off roll. But when it's 142 degrees in Kuwait, even with the afterburner, combat loads of two mavericks, two amrams, two aim9 mics, two 370 gal. external fuel tanks, an ECM pod, you have about six or seven thousand foot take off roll."

Kuwait is about the size of Rhode Island, and you can fly around the whole country in about twenty minutes. Traver says that when flying, it is hard to distinguish any difference between Iraq and Kuwait because it is all desert, but via the INS and AWACS you know exactly when you are in Iraq's airspace. "There's nothing fun about potential combat and knowing that someone may have a weapon locked in on you. But it does bring about several good things, such as camaraderie, knowing that you trust your fellow pilot to do what needs to be done and that he can expect the same from you...[and] the feeling that you are invincible. You don't get in an F-16. You strap it on your back, and it becomes a suit of armor which is a mentality that you really need, because if nothing else, bad luck (that one

golden BB) will be the one that finds you." Traver says, "You gotta think you're King Kong in that thing and that nothing can stop you."

Final thoughts...

"I joined the Air Force with a very honorable sense of loyalty to defend my country and the constitution of the United States and what God has given and entrusted to me. And to do that you do what the Congress and the Commander in Chief decide that you will do. I have not had to actively employ the F-16 under any real war circumstances at this point in my military career, but I am confident in my abilities and the aircraft that the United States Air Force has entrusted to me. The 163rd fighter wing and I would leave in a moment's notice to defend this great nation. I am honored and proud to be an F-16 fighter pilot for the United States Air Force."



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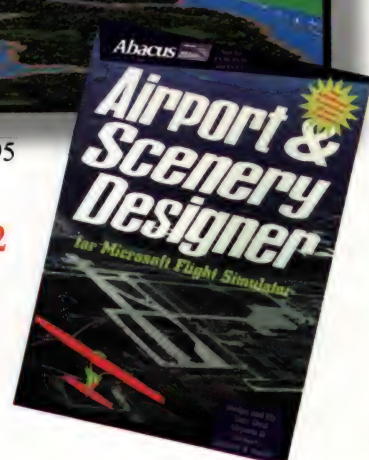
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The Virtual Hanger

Panel "How-To-Guide"

By Tim Dickens

Follow these steps and you can create your own customized FS98 panels

F S98 users have the ability to create or customize aircraft panels, without needing special tools, hex editors or a degree in high-level source code. This is a tremendous improvement over previous versions of the simulator. All you need is Windows95 Notepad or Wordpad to create a plain text file and a few bitmap and gauge tools.

But in addition to this, you also need to know what to type in there! Looking inside those Panel.cfg files, you see what looks like an FS computer geek's grocery list. Sound familiar?

Actually, it is not as difficult as it looks. *Full Throttle* is, from this day forward, maintaining an ongoing reader's guide to creating and customizing panels for FS98. This feature will be available as a resource to you in feature articles, such as this, and on our Web site at <http://www.ftmagazine.com>.

This first article is intended as a basic tutorial on customizing and creating new panels. I have a good working knowledge on the nuts and bolts of panel creation, as I have produced several myself, which are also available to you on our Web site. But I am by no means the Pontiff of Panels. There are many creative panel

artists out there who have come farther than I have, and I learn from them every day. This feature is intended as an avenue to share these secrets with you, and as I acquire more, to make them available to you.

In this first installment, I will outline the geography of the panel itself, show you how gauges are placed, how FS98 reads these panels, and where all the landmines are, since I have already stepped on quite a few. First, there are a few programs that you will find very useful if you want to do a first-class job. I will also outline a small project for modifying an existing FS98 panel, as an example.

Shopping list

- ➔ A good bitmap viewer/editor, like **PaintShop Pro**. You will need something like this to be able to modify the .bmp files, which comprise the physical panels themselves. **PaintShop Pro** is a shareware program, but it is well worth it.

You can use it for all kinds of applications, like scenery design, photo editing, etc. You can find the new beta version, **PaintShop Pro 5**, on the Jasc Web site at <http://www.jasc.com>. I will use this program in the examples set forth in this article. There are other programs which will work, but make sure that they have the ability to read the bitmap coordinates. You will see why.

- ➔ If you do not have it, get the latest SDK from Microsoft at <http://www.microsoft.com/games/fsim/>. It contains a lot of useful information on panel creation and other aspects of FS98.
- ➔ A slick little freeware gauge editing utility from Chuck Dome called **Gaubmp**. You can download it at <http://home.att.net/~chdome/GAU2BMP.ZIP>. This will give you the capability, along with **PaintShop Pro**, to change the color aspects of the gauges themselves.
- ➔ Another slick freeware utility from Chuck is **Gaum98**. Download it from <http://home.att.net/~chdome/GAUM98.ZIP>. This will give you the capability of editing the digital readouts on many gauges.

Navigating The Panel Bitmap

If you don't know your way around this important feature of the panel, it will be like being cast adrift in a dinghy, with sharks circling the area. We are going to use the new LearJet panel, available on our Web site, as an example in this feature. Here is what it looks like:



I suggest you load this .bmp into your bitmap editor so you can follow along. This image shows where the gauges are intended to go. It shows four of the gauges, as an example. The bitmap coordinates of these gauges are illustrated. You can locate these coordinates in **PaintShop Pro** by selecting the eyedropper icon from the toolbar and moving it to those coordinates on the image. The bitmap coordinates are displayed in the lower left-hand corner. Now look at the excerpt from the Panel.cfg file (see Program Listing 1 on page 18).

More on the correct syntax, and the contents of the Panel.cfg file, will come later in this article.

Now you say, "Hey, this is easy! All I have to do is relate the bitmap coordinates to the gauge location, and that's it, right?" Well, almost, but it's not quite that easy. Here is exactly how it works. First, if you have downloaded this panel, load the file Lear_custom_main.bmp into

PaintShop Pro and select **View | Image Information** from the menu bar. Notice that this bitmap is 1280 x 656. That means it's 1,280 pixels across (starting from the left) and 656 pixels up and down (starting from the top). Now, take a look at the Panel.cfg file for the panel. You will find this text, which

describes the physical size of the panel:

```
[Window01]
file=Lear_custom_main.bmp
size_mm=1280
window_size_ratio=1.0
position=7
visible=1
ident=40
```

Hmm...the panel dimension, in mm, is the same as the width of the bitmap in pixels. Coincidence? Not at all. I did that on purpose. It makes things easier. You can relate the width of the bitmap and the physical panel directly, without a calculator or slide-

rule. But if you are modifying an existing panel, the author may not have made it so easy for you. Take a look at the image of the default Cessna 182 RG panel (Figure 2).

Now, load the panel bitmap Cessna182.bmp from the FS98\Aircraft\C182\Panel.rg folder into **PaintShop Pro** and use the eyedropper again to confirm these bitmap coordinates I have illustrated for the airspeed gauge. Next, go to **View | Image Information**, and look at the size of the .bmp. It is 800 x 389 pixels. Then open the file FS98\Aircraft\C182\Panel.rg\Panel.cfg and take a look at the specified size of the panel. It reads:

```
[Window00]
file=cessna182.bmp
size_mm=600
window_size_ratio=1.0
position=7
visible=1
ident=0
```

Whoops. The physical size of the panel is 600 units (mm) across, and the bitmap is 800 units (pixels) across. Why did they do that? There is a very simple answer to that. According to the Microsoft design team, this was done in an attempt to provide bitmap-independent coordinates for gauges, so that they could change the pixel size of the background bitmap without having to edit the Panel.cfg file. This provided a means of easily specifying fractions of a panel. If you set your design size to 100 units, then a gauge at 50, 0 will start exactly halfway across the top of the panel.

Here is how you deal with this. Now you need a calculator, or a lot of scratch paper, if you plan on doing a major rebuild. But if you only want to make a few changes, it's not bad and pretty straightforward. First, get the ratio of the bitmap size to the panel:

Figure 2:
*Here is the default
Cessna 182RG
panel.*




```
600 (mm size)
+ 800 (pixels)
= 0.75 ratio
```

Even a math incompetent like me can get that. Now, take a look at the Cessna 182 RG panel image, where I have located the correct coordinates for the gauge (always upper left-hand corner of the gauge) at 206 x 60. Now multiply those numbers by your ratio:

```
206 pixels
x 0.75
= 154.5
-Round up to 155
```

```
60 pixels
x 0.75
= 45
```

Now, open the FS98\Aircraft\C182\Panel.rg\Panel.cfg and take a look at the entry for the airspeed gauge; it's listed as Program Listing 2.

It's that easy—almost. One more thing to remember: Take another look at the above window description for the main panel in the Panel.cfg file. There is one more entry you have to consider when calculating these dimensions. It is a size scalar option. In this case, it reads:

```
window_size_ratio=1.0
```

No problem. The scale is 1, so your calculated ratio is correct. But suppose some sadistic panel designer did this:

```
window_size_ratio=0.5
```

Then you would have to expand the above ratio calculation:

```
206 pixels
x 0.75 x 0.5
= 77.25
-Round down to 77
```

Program listings used in this article

Program listing 1

```
gauge04=SF3ee.Altimeter, 511, 219, 115
gauge09=767ee.StbAtt, 663, 221, 115
gauge06=REALLEAR_45.Airspeed, 814, 219, 115
```

Program listing 2

```
gauge04=Cessna_182.Airspeed, 155,45
```

Program listing 3

```
gauge00=Lear_45.Warning_Enunciators, 911, 131, 370
```

Program listing 4

```
[Window01]
file=Custom_avionics.bmp
size_mm=600
window_size_ratio=1.0
position=7
visible=0
ident=50

gauge00=Bendix_King_Radio.Nav_Comm_1, 427, 80, 165
gauge01=Bendix_King_Radio.ADF, 427, 163, 165
gauge02=Bendix_King_Radio.DME, 427, 131, 165
gauge03=Bendix_King_Radio.Xpndr, 427, 197, 165
gauge04=Bendix_King_Radio.AP, 427, 41, 165
```

```
60 pixels
x 0.75 x 0.5
= 22.5
-Round up to 23
```

Now, you are ready for the next step.

Creating And Modifying Bitmaps

If you have obtained a copy of **PaintShop Pro 5** (PSP), as described previously, you can follow along with the images and examples.

Creating and/or modifying the bitmap (.bmp) images used as the background, or "body," of an FS98 panel is crucial if you want to be able to

change existing panels to suit your needs or develop new ones from scratch. First, it must be understood that a *background* is exactly what an FS98 panel is. It has no functional properties at all, other than visual. The selections, actions and readouts from a finished panel are the properties of the gauges themselves, which are applied to the panel in the aircraft's Panel\Panel.cfg file.

As an example, we are first going to make a modification to the default Cessna 182 RG panel in order to create a new panel window for cleaner installation of the Bendix/King radio stack. After this new .bmp is created, you can find an example of what to do with it in the "Gauges" section of this article.



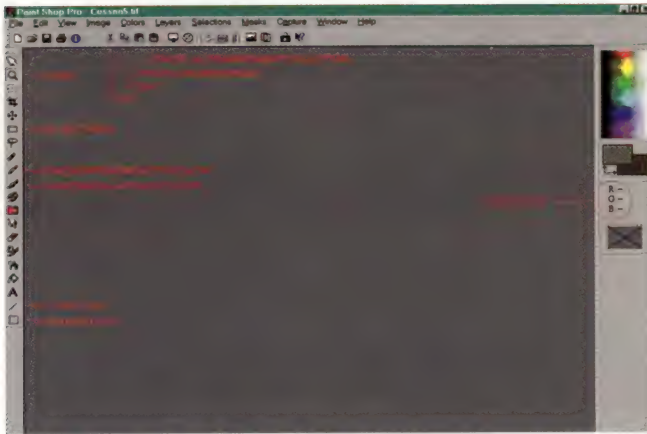


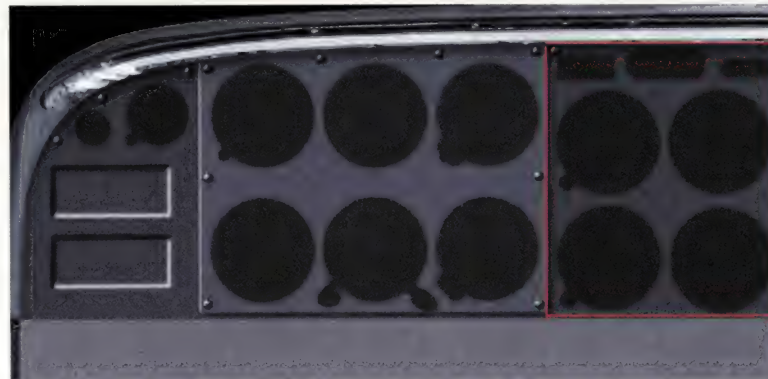
Figure 4:
This Paint Shop Pro screen shows its various drawing tools.

Step one, not surprisingly, is to open **PaintShop Pro**. The first thing you need to do is make sure some of the more critical tools are available to you on the main (top) toolbar. Go to **File | Preferences | Customize Toolbar** and make sure the options "Cut," "Copy," "Paste as New Image" and "Paste as Transparent Selection" are included on the main toolbar, together in one spot. If not, add whatever is missing using the **[add]** button. You need to use these functions quite a bit, and having them on the toolbar, instead of the menus, is very convenient.

Let's take a look at the main screen, so that you will be able to find some of the critical tool selections (see Figure 4).

Now, open the .bmp
FS98\Aircraft\C182\Panel.rg\Cessna182.bmp. Before doing anything, make a copy of the image and close the original. *Never work with an original .bmp when making modifications!* To do this in PSP, go to the menus and chose **Selections | Select All**. You will see a border consisting of dotted lines around the perimeter of the entire image. Now go to the main toolbar and choose Copy. Close the original Cessna182.bmp file. Now go back to the main toolbar and choose Paste as New Image. Now you have a working copy of the Cessna panel. Name your copy "Custom_avionics.bmp," and make sure it is saved in the FS98\Aircraft\C182\Panel.rg folder.

We are going to create a new .bmp of only one section of that image, by erasing everything else. The only portion of the image we want to keep is the right-hand side of the panel, where the engine gauges presently reside, illustrated here:



You want to remove every feature of the image, except for that outlined portion, by painting every area outside of the outline color black (RGB 0 0 0). FS98 is programmed not to see this color within the panel windows, so if we do this, only the outlined area will be visible when the panel is called up.

First, you will need to be able to control the painting tools that we are going to use. On the menu, go to **View | Tool Bars** and select Control Palette.

Select the eyedropper tool and left-click on the black portion above the image of the panel. The RGB display should read R 0, G 0, B 0. I (index) should read 255 (color No. 255 on the palette). Now select the shape tool.

Remember that you have already opened the control palette. Specify a Rectangular Shape, Filled Style and one-pixel outline width. Experiment with the shape tool a little bit on the left-hand side of the bitmap. Left-mouse click and hold it to start the shape, let go of the mouse button to set its dimensions. You will see that it paints the area within the shape with the color you have selected. Once you have practiced a bit, use the shape tool to paint all of the bitmap black, RGB color 0 0 0, except for that portion of the panel you are going to preserve for placing the radio stack.

For detailed, close up work, use the Zoom tool and focus on a magnified part of the image. Left-click zooms in, right-click zooms out. You can use the line tool or the paintbrush to do

accurate, detailed work. Just remember to always be aware of the pixel-painting size of each tool you use, which is selected on the Control

Palette. As a backup for what you are doing, PSP incorporates an undo tool on the main toolbar (the "oops" key). You can always undo the last operation you performed.

You should now have a bitmap that looks like that in Figure 6.

The last step in this process is to remove the round gauge shadowing which is still present on this part of the new image, since they do not make sense for placing rectangular radios. What you are going to do is use the copy and paste tools to replace those round shadow images with the same color pattern of the surrounding panel.



Figure 6:
*This is now how
your bitmap
should look (see
page 19).*

We continue creating this modified panel, but first, a little bit of background on the gauges themselves.



Gauges

For our purposes here, we are going to discuss how to determine the size of the gauges for correct placement and how to make visual modifications to them to suit your aesthetics/color scheme for your panel. I will not be talking about the complex hex editing of the guts of the gauges themselves, because quite frankly, I know only enough to get you into big trouble. I am studying the gauge SDK from Microsoft, and hopefully with the aid of that, and perhaps with the help from some kind, knowledgeable soul, I will have something to offer in this regard soon. So for now, let's concentrate on what we can do with the knowledge at hand.

The most important things you will need to know are how to determine the dimensions of a gauge and how to change some of its visible characteristics. A brief look at the syntax of the Panel.cfg file is in order.

If you have downloaded my LearJet panel, open the .cfg file and take a look at the first entry, for the warning enunciators (see Program listing 3 on page 18).

You can see the rationale for the coordinates of the gauge in this image. Now the third number in the string becomes important. The number 370 is the width of the gauge, in mm. The width was determined by the amount of space I had left on the right-hand side of the panel. This is your best alternative for placing all of your gauges. Determine their location, and how large you want them on the panel, by counting the pixels, and if necessary, multiplying by the appropriate ratio as outlined above. If you do not specify a third number in the string, FS98 will use the default size of the gauge. And there is no standard size. So if you leave this blank, you could get a microscopic gauge, or it may take up your entire panel, like a big Cyclops eye.

The next thing that you need to be aware of is that the shape/dimensions of the gauge are likely not what you expect them to be, based on their actual appearance on the panel. To illustrate this, let's return to the airspeed gauge on the default Cessna 182 RG panel. Notice that the "start" coordinates of the gauge specified are somewhat outside of where you visually see the dial readout. We will take this gauge apart using Chuck Domes **Gaubmp** utility and you will see why. You will

find the gauge in the FS98\Gauges directory: Cessna_182.Airspeed.gau. But first, make sure you copy this gauge from that directory into a working directory where you have placed the **Gaubmp** utility. Do NOT use your only copy of a gauge when doing modifications.

Remember the old adage: "Save early and save often." Now, with the gauge file in the same directory as the **Gaubmp** utility, double-click on the **Gaubmp** icon and select that gauge. In a moment you will see the screen in Figure 7:

You will see that this gauge contains four compressed bitmap files. Put a number in the box marked "Bitmap Number" and select View Bitmap. Press "show" and you will get the screen in Figure 8.

You can determine which bitmap you are interested in with this screen. In this case, we want bitmap #1. Return to the main screen, make sure "1" is selected in the Bitmap Number box, and select Convert To BMP. Give this .bmp a name and select convert. Now exit the **Gaubmp** utility. Go to **PaintShop Pro** and open this new bitmap. It will look like Figure 9.

This is the actual shape of the gauge. Notice the screws in the three corners and the square background. Also notice how it correlates with how the gauge coordinates are specified in the Panel.cfg file, and how the gauge actually appears on the panel. Why doesn't the gauge appear as a black square with a circular pattern in the middle? Simple answer: the color of that black square. Take your eyedropper tool and place it on a portion of that black square. Notice the R G B value of that black color on the right-hand side of the **PaintShop Pro** display. It says "0 0 0." That's the secret color FS uses for displays (including the scenery



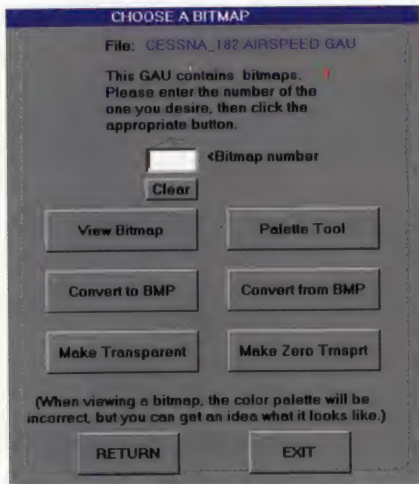


Figure 7



Figure 8

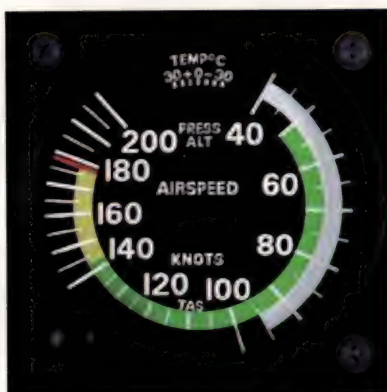


Figure 9

Use the Zoom tool to focus on a small aspect of the color pattern you want to use, adjacent to one of the round shadows. When performing copy and paste in the manner you need to for this exercise, go to the color palette squares right above the RGB display. The top square is for a primary color, the second for a secondary color. More on the meaning of these squares will be found in future tutorials on image creation/editing. For now, you need to know that you *do not* want any of the colors you are copying and pasting to appear in either of those squares.

Otherwise, one of the colors you want to copy may turn to black 0 0 0. Trust me. Just select two colors that you know are not part of that color pattern you want to copy.

Now, click on the Select Area tool. This defines a specific area that you want to utilize. Choose a small portion of the color pattern you want, and left-click and keep the mouse button depressed to start the area. Release the mouse button to end the area definition. Right-click to erase an area definition. You will see a rectangular shape with moving dashed-lines. This is your area definition. Now go to the main toolbar and select Copy. Then select Paste as Transparent

Selection. Your cursor will now be holding onto a rectangle of the color pattern you want. Place it over part of one of those round shadows, and when it is in position, left-click. Right-click to confirm the placement. Keep performing this operation until you have built up a sufficient area to make a larger area definition, then copy that and keep pasting. Within one minute you should be finished, and all of the round shadows will be covered up.

Make sure you save this new image Custom_avionics.bmp in the FS98\Aircraft\C182\Panel.rg folder.

engine) which can be made "transparent." The FS panel display is programmed to ignore color 0 0 0. So, you only see the detail in the center of the gauge, transposed on the panel where you want it. That's how it works. Because these shapes are also not standardized, you will sometimes (most of the time) have to tweak your gauge placements just a bit to make them fit like you want.

Working in this fashion with the gauge utility and **PaintShop Pro**, you can modify the appearance of gauges, particularly colors, to suit your needs. For digital readouts, Chuck Dome's **Gaum98** will do the trick. It is a simple, self-explanatory utility that will change the color and the offsets of digital readouts on gauges.

Finishing our custom panel modification

Now let's pick up where we left off in setting up the custom radio stack for the Cessna 182 RG panel. You have created the custom bitmap and now understand something about how to place FS98 gauges. So let's do it.

1. Find the portion of
FS98\Aircraft\C182\Panel.rg\Panel.cfg
that reads:

```
[Window01]
file=Radio_Stack_bg.bmp
size_mm=170
window_size_ratio=1.0
position=8
visible=0
ident=50
```

Put a comma ',' in front of each entry. FS98 will now ignore those entries, but you can restore the original configuration by removing the commas.

2. Directly underneath you will find the gauges listed. Put a comma in front of each gauge entry to "comment" them out.
3. Now, with the default entries commented out, add the entries in the Program listing 4 on page 18).

Notice that I have now made this panel window 600 mm wide, like the main panel. Remember, we cut the bitmap for this custom edition out from the main panel, and left it in its original location. Therefore, the panel size specified is the same as the main panel we took it from. The black color 0 0 0, which comprises most of this custom edition, is transparent and will be invisible when overlaid onto the main panel, except for the color portion we left in place.



Therefore, the gauges are now placed according to the guidelines set forth, with a 600-mm panel as its basis.

Done! Now start FS98, go to **Aircraft | Select Aircraft** and bring up the Cessna 182 RG. Press the avionics button, and your display will now look like this:

The engine gauges disappear and are replaced by the radios, which are now embedded into the main panel, rather than being called up in a separate view window which is invariably in the way. Of course, you can return to the gauges any time by pressing the avionics button again.

This exercise is intended to provide you with a working example. Based on these guidelines, you can modify any panel you like, not necessarily the

default Cessna panel. Upcoming issues will have more examples and feature articles on customizing/creating gauges.

The PANEL.CFG File

In addition to the syntax for placing gauges, there are a few other details about the Panel.cfg file you should know. Let's use the Panel.cfg file for the new LearJet panel as an example. There are four major components to the Panel.cfg file.

- Definition of the windows available for the panel
- Specifications of each window and gauges to be applied to it
- Color specifications
- Default window size

Section One

The first section, and most important to avoid errors in FS98 when loading the panels, is the windows definitions. You can apply up to 64 windows for a panel (no, really), from #00 to #63. Here are the definitions for the new Lear panel:

```
[Window Titles]
window00=Learjet Posts
window01=Main Panel
window02=Upper Panel
```

These descriptions are exactly how they will appear in the FS98 **Views | Instrument Panel** menu, so don't misspell anything! All components of these windows are described in section two. Panels are loaded in the numerical order specified. Therefore, if Window01 is designed to cover part of the same space as Window00, Window00 will be covered up in that one area. You can

make use of this when making switchable, multiple displays. This will be discussed in future additions.

LANDMINE:

Once you define a panel window, you must go through with it in the second section of the Panel.cfg file, otherwise an FS98 error may occur. See Section Two.

Section Two

This section describes the physical attributes of the panel window, including the gauges. Let's use the first window as an example:

```
[Window00]
file=Learjet_posts.bmp
```

Calls the correct .bmp file for the panel window.

LANDMINE:

If the name of the bitmap called is not identical or if it is not present in the same folder as the Panel.cfg file, an error when FS98 tries to load the panel is guaranteed! This is a common problem people encounter when installing new panels!

Also:

Do NOT use anything but a 32-bit zip utility and file manager to unzip and move these files, otherwise a change in naming syntax may occur, like replacing “_” and “-” symbols with “~” symbols. This will cause an error when FS98 attempts to load the panel! Another common problem people encounter when adding new panels.



size_mm=1280
Specifies the physical (virtual) size of the total panel area.
Window_size_ratio = 1.0
Optional window size scalar. If none is specified, 1.0 is the default
position=2
Position of the panel on the screen, defined as follows:
0 = upper-left corner
1 = upper-middle side
2 = upper-right corner
3 = middle-left side
4 = middle
5 = middle-right side
6 = lower-left corner
7 = lower-middle side
8 = lower-right corner
Any panel window can be undocked and placed anywhere you like.
visible=1
Specifies whether the panel window is visible when the panel is booted. 1=visible, 0=hidden. If nothing is specified, 1 is the default.
ident=10
User identifier for the panel window. Useful for some switchable panel/gauge options to identify it (like our avionics switch made to look for ident=50).
gauge00=767ee.Wiskey-COMPASS, 1200, 125, 90
first gauge
gauge01=Citation_Temp, 1206, 177, 90
second gauge

Gauges must run in numerical sequence, starting from 00 and up to 63. Once a numerical sequence is broken, the remaining gauges will not be visible. There should be no spaces in the sequence gauge00=Mygauge, etc. The rest of the line may contain spaces. Also, do not use the extension .gau in the descriptions.

Section Three

Syntax: [8-Bit Colors] If you have a special color palette shade that does not show properly on your FS98 panel, you can specify up to 32 additional

Phoenetic Alphabet

A	alpha	N	november
B	bravo	O	oscar
C	charlie	P	papa
D	delta	Q	quebec
E	echo	R	romeo
F	foxtrot	S	sierra
G	golf	T	tango
H	hotel	U	uniform
I	india	V	victor
J	julie	W	whiskey
K	kilo	X	xray
L	lima	Y	yankee
M	mike	Z	zulu

Conversions

Statute Mile (SM)
5280 feet

Nautical Mile (NM)
6076.115 feet

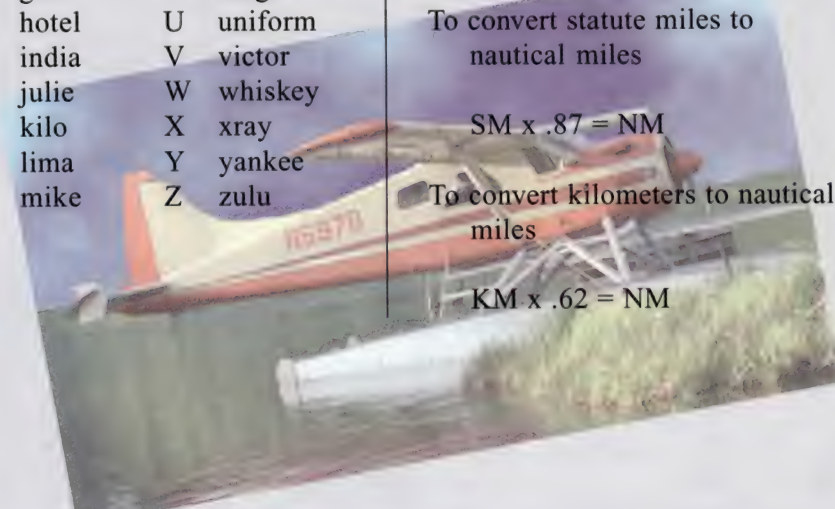
Kilometer (KM)
3280.8 feet

To convert statute miles to nautical miles

$SM \times .87 = NM$

To convert kilometers to nautical miles

$KM \times .62 = NM$



colors per panel. These additional colors affect both panel bitmaps and gauges. The colors, like all color palettes, use the Red Green Blue format (RGB). This is the order they are listed in at the bottom of the Panel.cfg file. For example:

[8-Bit Colors]
color00= 66, 70, 93

means shade 66 red, 70 green, 93 blue. This corresponds to the same system used in the *PaintShop Pro* color palette. So if you select a color in PSP that looks just right, say a shade of greenish blue, you can read the RGB value from the palette display at the right-hand corner of the *PaintShop Pro* screen. Simply list this value in the color specifications in the Panel.cfg file, and it will show up. For example, if PSP reads R 0 G 255 B 255, list it as

[8-Bit Colors]
color00=0, 255, 255

Listing additional colors for your panel is optional.

Section Four

This section specifies the actual size and position of the outside view. This can be particularly useful for oddly shaped panels, so that it will not be necessary to constantly resize the window to fit the panel.

Conclusion

I hope you have found this article useful. Future editions will explore the creation of bitmaps more thoroughly, and hopefully, the creation of gauges. I invite your inquiries, comments and suggestions.

The Virtual Hangar

Filling Your Hangar

By David Lewis

*Thinking of designing your own aircraft?
David Lewis' primer will get you
started...*

One of the great joys of aviation is flying an aircraft that you have built yourself. This is just as true in simulated flying as it is in the real thing. I have been building and flying my own planes for Microsoft **Flight Simulator** for two years, and unlike the real world (where homebuilt planes are limited to the size of the garage in which they are built), I have even built and flown my own jumbo jet.

In this column I will discuss the details of building your own planes for Microsoft Flight Simulator, with step-by-step examples. I will advise you on converting planes to run with different versions of the simulator, and discuss specific problem planes. There should be something in here for the beginner and the expert, and everyone in between.

To begin, let's look at what makes up a simulated aircraft and how to use one that someone else has created. Each aircraft has several parts, mostly held in separate files:

- ➔ A shape; how big is it, where are the wings, the engines, etc.
- ➔ Paint job; is that 737 painted up as British Midland or as Southern?



- ➔ Flight dynamics; How fast will it go? How much does it weigh?
- ➔ An instrument panel; the dashboard you see below the windscreen.
- ➔ A set of sound effects; engine noise, flaps lowering, the bump of touchdown, etc.
- ➔ Documentation; often forgotten, but vital to safe flying!

- ➔ One of the constant annoyances to me as a plane builder is that the files for these parts are not compatible between different versions of MSFS. So, be sure that the add-on plane you choose is right for your version of the simulator (FS5/5.1, FS95 or FS98). Aircraft produced for FS5 using the **Flight Shop** add-on program can also be converted to either FS95 or FS98, using the free converter programs available from the Microsoft Web site.

The internet is a good source of add-on aircraft. Check out <http://www.flightsim.com> or <http://www.wings.ark.com>, which have file libraries of planes for each version of the simulator. Aircraft are also available on CD collections from your favorite flight simulator software vendor.

So, let's assume you've found a plane you want to fly. What are all the different files for, and what do you do if there were no instructions on how to use it? After you've unzipped the files, here's what you've got and where it goes for each MSFS version:



FS5

Note that most add-on aircraft for FS5 require that you have the Flight Shop program installed. If it isn't present, you will see an error message saying "simfsfs.fso not found." There are about a hundred aircraft that don't need Flight Shop, and they all make a feature of the fact. Here is a rundown of the files for these aircraft and where they go:

- ✈ *.air defines the plane's shape and flight dynamics. Install this file in your flightsim\sim directory.
- ✈ *.r8 contains paint work details. Install this file in your flightsim\texture directory.
- ✈ *.laf, *.2af, etc. are also paint work files.
- ✈ *.pnl contains instrument panel information. Install this file in your flightsim\panels directory, but be very careful not to replace any files that are already there, and only use it if you understand the instructions.

I'll deal with panels in more detail in another issue. The same is true for *.pix and *.gau files.

- ✈ *.wav files are sound effects. Install this file in your flightsim\sound directory, but only if you know how to save the files that are already there. New sounds will almost always have the same name as an existing sound file, so you should think about how to restore the old sound file if you don't want to keep the new one. Sounds will be covered in more detail in a later issue.

FS95

- ✈ *.air contains the flight dynamics. Install this file in your flightsim\sim directory.
- ✈ *.mdl determines the shape of the aircraft. Install this file in your flightsim\sim directory.
- ✈ *.r8 contains the paint details. Install this file in your flightsim\texture directory.
- ✈ *.laf, *.2af, etc. are also paint work files.
- ✈ *.pnl contains instrument panel information. Install this file in your flightsim\panels directory, but be very careful not to replace any files that are already there, and only use it if you understand the instructions. I will deal with panels in more detail in another issue. The same goes for *.pix and *.gau files.
- ✈ *.wav contains sound effects. Install this file in your flightsim\sound directory, but only if you know how to save the files that are already there. New sounds will almost always have the same name as an existing sound file, so you should think about how to restore the old sound file if you don't want to keep the new one. Sounds will be covered in more detail in a later issue.

FS98

Each aircraft for FS98 is installed to its own directory, flightsim\aircraft\aircraft_name. I will call this the "main" directory. Within the main directory are subdirectories called "\model," "\panel," "\texture" and "\sound."

- ✈ Aircraft.cfg contains the basic information on files used to make this plane. This goes in the main directory.

- ✈ *.air contains the flight dynamics. Install this file in the main directory.
 - ✈ *_check.cfg contains the aircraft checklists. Install this file in the main directory.
 - ✈ *.r8 defines the paint details. Install this file in the \texture directory.
 - ✈ *.laf, *.2af, etc. are also paint work files.
 - ✈ Panel.cfg contains instrument panel information. Install this file in the \panel directory, along with any
 - ✈ *.bmp files, which are pictures of instruments.
 - ✈ *.gau files should be placed in the FS98\Gauges directory. The gauge files for FS98 can use the Windows95 naming convention, like Cessna_182_favorite_autopilot.gau. I highly recommend that you only use a 32-bit zip utility, such as Winzip 6.2, to decompress aircraft and panel files for FS98. Otherwise, your zip utility may change the naming convention using ~ symbols, and your new panel/aircraft may not work. Model.cfg contains shape file information. Install this file in the \model directory, along with any *.mdl files, which are actual shapes.
 - ✈ Sound.cfg contains sound effect file information. Install this file in the \sound directory, along with any *.wav files, which are the actual sound effects.
- The other thing that should be included with any plane is a file called "readme.txt," "readme.1st" or another text file with information on how to fly the plane! It may seem too obvious to mention, but not everyone knows the stalling speed of a fully loaded 747-400. Imagine yourself on final approach with flaps and gear lowered, easing back the throttle for a gently landing, when all of a sudden the plane stalls

sharply at only 500' above ground! The plane crashes with the loss of all on board (and wastes a couple hours of your evening). If only you'd known that a 747 stalls at 121 knots, you would have kept the speed up to 150 knots on the approach and landed safely. In real aviation, the pilot's operating handbook is considered a vital part of the aircraft. It is simply not safe to fly without it.

So, what do you do if the handbook is missing? You have a fully fueled plane ready to fly, and you have worked out your flight plan, but there are still a lot of important questions to be answered. Will your new plane go that far? How much fuel will you need for the journey? How fast should you fly (and more importantly, how slow can you go and keep flying)? How high should you fly? With a real aircraft you get a comprehensive handbook, detailing cruise speeds (along with throttle settings, associated RPM, and rate of fuel use). With a simulated aircraft, you don't always get that level of support. So the next best thing is to find out for yourself. Here's my nine-point plan for getting to know a new plane:

- ➔ Get airborne. Level off at a useful altitude, and throttle back to about 80% throttle. Set the autopilot to hold heading and altitude.
- ➔ Wait for everything to settle down. The plane will probably rise and fall for a while (known as porpoising) before it stabilizes at the selected altitude. It will also accelerate until it reaches a limiting speed.
- ➔ Write down the fuel in the tanks (in lbs or gallons) and the time.
- ➔ Wait ten minutes. Go and make some coffee.
- ➔ Note the fuel remaining and the airspeed.

- ➔ Calculate rate of fuel burn, endurance and range (see below).
- ➔ Repeat this process at different altitudes—you'll get different answers!
- ➔ Close the throttle completely (zero power) and continue flying straight and level until the plane stalls—the nose will suddenly drop. Record the speed at which the stall happens.
- ➔ Repeat #8 with full flaps and the landing gear down.

Now the calculations:

- ➔ Rate of fuel burn = (fuel remaining at step 5 - fuel at step 3) * 6; that's how many lbs or gallons of fuel the plane uses in an hour.
- ➔ Endurance = Full fuel capacity /
- ➔ Rate of fuel burn; that's how long you can fly, in hours.
- ➔ Range = Cruise speed * Endurance; that's how far you can go, in nautical miles.
- ➔ Approach speed = Stall with flaps * 1.5 (for safety).

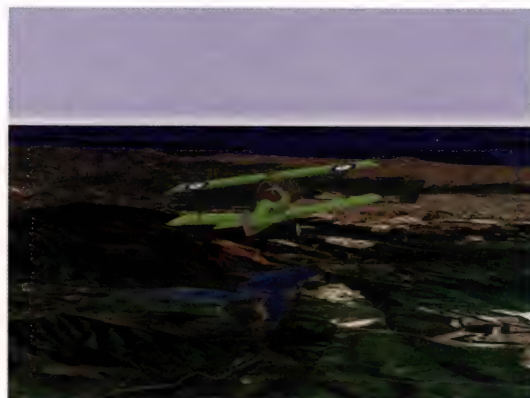
I tested the Sopwith Camel included with MSFS, and you might like to do the same for comparison. At 2000' the Camel cruises easily at 90kts, and uses 14 gallons of fuel per hour. That allows an endurance of less than three hours, with a range of 200

nautical miles. The Camel stalls (sometimes quite sharply) at about 42 knots, so a safe approach speed would be 65 kts.

Hey, now you're a test pilot as well. Congratulations!

This kind of test flying is not just useful when you first fly a new plane that someone else has built. It's also what you have to do to check that your own plane is performing the way you want it to. This is how you will find out if your F-15 jet fighter has a top speed of 180 knots, and burns all its fuel in 11 minutes. Assuming that you choose to build a current or historic aircraft type, part of the objective must be to make it as true to life as possible, "as real as it gets."

Next time, we'll start building a new plane using Flight Shop, a commercial software package including aircraft design and ATC adventures. I've chosen the Flight Shop package because it really is the easiest way to create a new plane, and because it creates files that can be converted to work with every version of MSFS. In another issue I will look at other tools for building aircraft, but they are not for the faint-hearted! I will be taking you through the construction step by step, starting with the shape, then the flight dynamics, paint job, panel and sounds. When we cover the paint job, I'll also explain the different ways of repainting aircraft that other people have created.



Since this is a training exercise, I'll provide plans and documentation for a classic training aircraft: the Tiger Moth.

Later in the series there will be other aircraft to build. You might like to build another plane of your own choice at the same time. You should start looking for information about the plane that you want to build. You will need:

- Drawings of the side, top and front views.
- Measurements, such as the wingspan, length, wing area, weight, fuel capacity, propeller size, etc. If you can't find these, you can measure them off your drawings, which will be less accurate but quite close.
- Performance information, such as top speed (at what altitude?), range, endurance, rate of climb, etc.
- Paintings, illustrations or photographs for the paint job you want to use.

There are many books with this kind of data. The definitive source is Jane's *All the World's Aircraft*, although many smaller books are also useful. Jane's does not include any color pictures, so you will need to look elsewhere for painting ideas. However, Jane's has a mountain of measurements that are hard to find elsewhere. For the 747, for example, aside from the obvious entries like wingspan, Jane's includes the wheel base, wheel track and the width of the tail plane, which are all very useful, as well as the height and width of the doors and the number of toilets! Jane's is an annual publication, concentrating on new models appearing in the year, and is also quite expensive, so find out whether your local library has back issues.

Another good source of data is the Putnam series of books on aircraft manufacturers. They have books on all the big names, e.g., Lockheed and De

Havilland, with photographs, drawings and performance data on all their aircraft. There is also usually a good history of each type.

At the other end of the scale, I have found some excellent scale drawings and paint instructions included in plastic model kits, such as the Airfix range. As a free bonus you also get a plastic model to assemble and stand on top of your computer screen!

Good luck on your research. I hope this piece has fired you up to build and fly your own simulated aircraft. If you have any feedback, please let me know what you would like to see covered in this column.

Problem planes #1—a wheel at each corner

In each issue I will look at a particular challenge of plane building. Topics will include helicopters, floatplanes, landing lights, moving parts and bleed-through. I'll start with the center of gravity. One of the most frequent complaints about add-on aircraft is that they are difficult to control, especially on autopilot. Sometimes this is an accurate simulation of a difficult aircraft, but more often it is caused by inaccurate basic data. This creates particular problems when the plane is converted for a more recent version of MSFS. FS5 is quite forgiving of strange configurations; FS98 is not.

Never assume that the people who create add-on aircraft are experts in aerodynamics. Some of them are very good, but the art of making a plane look good and the art of making it fly properly are two quite different things. The best-looking plane may have the least realistic handling. Nobody certifies add-on planes for accuracy.

Part of the problem is that MSFS needs to be told some things twice, like the size of the wings. You tell it once when you build the shape of the plane, and again in the flight dynamics. You

don't have to tell it the same thing each time. So you can produce an accurate-looking Piper Cub which flies like a plane ten times the size. To make things worse, the handling is invisible: the wings look the right size, so we assume they are defined as the right size for the dynamics.

One classic problem area is the center of gravity (CofG). Flight Shop does not place a center of gravity on the aircraft, but builds the aircraft around its CofG. The wheels are positioned a certain distance in front of it or behind it, and so are the wings. Unfortunately, the position of the CofG does not appear on most drawings, so aircraft builders have to guess. If they guess wrong, their plane will be unstable. Luckily, Flight Shop also has stability scalars, so that an out-of-balance aircraft can be made to fly. It may need some other adjustment, such as a tailfin the size of a football field, but then it flies. However, it converts to FS98 as an uncontrollable monstrosity, and so it should!

The CofG should be very close to the position of the wings. In most cases, the wings should be zero inches forward or aft of the CofG. The main wheels should also be near the CofG, but behind it for tricycle landing gear and in front of it for taildraggers. As a rule of thumb, look at the distance from the main wheels to the third wheel, and put the main wheels a twelfth of that distance in front of the CofG for taildraggers, or an eighth behind for tricycle gear. Aircraft that are much different from this will be difficult to control in the air (for the wings) and on the ground.

If you have Flight Shop yourself, you may like to check the parameters used on some of your least favorite add-ons. If you don't have Flight Shop, you can use Ian Donohoe's ADE utility. The results may surprise you!

The Virtual Hanger

FS98 Panels-To-Go

By Eric Ernst

Want to know how panels are designed and created? FS98 Panels-To-Go will give you great background information.

When I was 12 years old I was an Engineer on a 747! Well, that is not exactly true. But I did get to sit in that chair for an entire simulator ride when my father was getting a recurrent check ride. Thus began my interest in airliner panels.

I have been using the **Microsoft Flight Simulator** program ever since it came out. This is the first version that I have been completely hooked on because of the level of realism that can be achieved. And Microsoft has made panel designs easier in this version with the release of the Software Development Kit (SDK). I would like to share with you my panel design "career" and teach some basics of panel design along the way.

The Beginning

As with any release of Microsoft's **Flight Simulator**, I had the usual build up of excitement. I would always hope that the new version would give me more realism. One of the Captains for my airline told me about the new version and said it was great! Taking that advice, I finally got myself a copy and loaded it up. As has been the case with every version, I was disappointed with the default panels. I cannot fault

Microsoft because I am sure they have to make the product compatible with all machines and at all screen sizes. So I headed for the internet.

As usual, I found some really nice freeware panels at my favorite hangout, Flightsim.com (www.flightsim.com). I installed a 777 panel made by Antonio Ambrosio that was very nice. But the 777 was not my ultimate panel, the 767 was. But there were no 767 panels around. What was I to do? I started looking at the design of Antonio's 777. I quickly figured out the basics and put together a nice "767-like" panel. And with the permission of Antonio, I released version one of my 767. Needless to say, I became hooked on panel design and have since released

version six of my 767 and many other airliner panels.

The Boeing 767 Panel

To say that this is my favorite airplane of all time is an understatement. My father retired as Captain on this airplane, and I was in the cockpit jumpseat for a whole trip. This has been and continues to be my inspiration for this panel. This picture of my current 767 panel represents about two-and-a-half months of work with many all-night design sessions. One of these sessions lasted 26 hours (I must be insane!). Here is how it came about.

This picture of my current 767 panel represents about two-and-a-half months of work with many all-night design sessions.



767 Versions Two through Four

After the release of version One of my panel, I got some old 767-panel diagrams that were lying around the house. This was a big help in designing the panel, because now I could see what each gauge looked like and where it should be. I was also able to modify the background panel to look more like the real 767. The panel background is nothing more than a big picture file (in .bmp format) that lays underneath all the gauges. This background file is created and modified using a standard Windows 95 paint program.

Once you have created the background for the panel, you have to put in the gauges. The panel.cfg file controls the location and size of gauges in the panel. Having already figured out most of the variables for the panel.cfg file (Microsoft has since released the SDK that explains everything), I needed to go to work on the gauges. This required skills that I did not have at the time. Enter Chuck Dome and his utilities.

The first one I used was "Gauge to bmp" (**Gaubmp**). Each gauge for FS98 is made up of variables (that describe the function of the gauge to the FS program) and pictures (to display the gauge). The **Gaubmp** utility looks into a gauge file to find the picture files (in .bmp format) that make up the gauge; it then allows you to extract the image or input new ones. This has been and continues to be the most useful utility ever for panel design.

Once you have extracted the bitmap files from the gauges, you can now "repaint" them using almost any type of graphics program. **Paint Shop Pro** (shareware and well worth the money) works very well for this. Now I had the capability to make the default gauges look like 767 gauges.



The ADI gauge was the most difficult to modify because the colors are limited. Also, three pictures make up the ADI background, so it took some time to achieve the 767 look from the default 737 gauge. The ADI on the 767 is one of the most easily distinguished gauges in flying.

The next item to tackle after changing the pictures in a gauge is improving the digital readouts. Chuck Dome's other great utility, **Gaumod98**, is perfect for this. This utility allows you to change the size, shape, location and color of the digital readouts in a gauge. This is perfect, because every gauge on the default 737 panel is too small and a horrible red color.



In comparing the altimeters for the default 737 panel and my 767 panel, you can see both **Gaubmp** and **Gaumod98** utilities in action. The background altimeter picture and the altimeter needle have been changed using **Gaubmp**. Then using the **Gaumod98**, I changed the digital readout's color and size.

Up through version 4.3 of the 767, panel I used only these techniques to create the panel. Now it was time to create an even better panel.

767 Version Five

While continuing to develop this panel, I was also busy making a panel for the Saab 340 (the aircraft I fly in

real life). After I finished making the Saab 340 panel, I decided that it would not take too much effort to make a Saab 2000 all-glass cockpit panel. So I set out to do this. During this design effort I had a revelation: I can create an HSI that looks like the ARC mode we have in the real plane.



Basically, the ARC mode is just an oversized compass rose that displays about 70 degrees of heading information. The benefit is that you can make very precise heading corrections, and it is much easier to read. This is the mode used on most modern commercial airliners today. I created this HSI ARC on my Saab 2000 panel first, and then set forth to do it on the 767 panel. In order to create this for the 767, I used an oversized HSI (that had been extensively modified using the utilities) in a different window on the panel.

Panel "layers" using different windows is one of the major benefits of FS98. Without getting into too much detail, the way you do it is create two layers of a panel. The bottom layer contains the oversized HSI that has been properly positioned. Then the top layer has a "see through" hole that displays only the information you want—in this case, just the 70 degrees of heading, thereby creating the ARC mode. This type of panel layer system is employed on almost all of my panels now for various reasons. I will explain why this is so important as I discuss my current version of the 767.

767 Version Six

About the time I created version five of my panel, I started a dialog with Andreas Jaros. Andi is a very talented panel designer. He introduced me to the Freeware Panel Designer Association (FPDA). We are a group of designers who like to create freeware panels and exchange information. We have made some great discoveries that allow us to modify existing gauges very nicely. We also have two very good gauge programmers that contribute new gauges when an existing one just will not work.

One of our programmers is Hiroyuki Toyohara (Toyo) from KT Project. I think everybody is familiar with the amazing panels that have come from his shop. Toyo created five great gauges for my panels that have really taken my designs to a new level of realism.

To really appreciate the realism that has been created, I would like to discuss three distinct items in my 767 version six that showcase advanced panel creation: the autopilot, EADI (Electronic Attitude Direction Indicator) and the engine gauges.

Andi and former FPDA member Philippe Legait introduced me to manual editing of the gauge files. The benefits are you can move or modify almost every component in a gauge. This capability allowed me to create an almost 100% accurate rendition of the 767 autopilot from the default 737.

It was not easy to do, but the benefits are well worth it. One person

techniques and Toyo's gauges, I was able to make this EADI very close to accurate for 767s operated by US carriers.



The ADI is the default 737 ADI, modified to look like the 767. It resides on the main panel layer. The gauges that surround the ADI are mostly custom gauges that lay on top of the ADI on a separate panel layer. The separate layer is necessary to prevent conflicts with the ADI. The problem with closely grouped gauges is that if they overlap (even by a little) you will have interference. Panel layers eliminates this problem.

As you can see in figure six, we have the ADI surrounded by the Glideslope, Radio Altimeter, Localizer, Fast/Slow indication and autopilot enunciators. There is also a tape-style radio altimeter right next to the ADI. All of the custom gauges where created by Toyo except the digital radio altimeter (courtesy of Philippe Legait).

Most panels you find on the internet don't have these gauges surrounding the ADI, though many are now starting to appear. The latest gauge that I added was the Fast/Slow gauge. This might be the first time virtual pilots are seeing this type of gauge. This indication shows you if you are faster or slower than the speed you have

set in the autopilot panel. This is most beneficial on approach when trying to

maintain the proper approach speed. Having added the Fast/Slow gauge to the EADI, you now have the capability to tell the exact status of your airplane without making an extensive scan.



The final major area that I worked on was the engine gauges. Using the engine gauges from my Saab 340 panels (these were modified by Andi for his A320), I was able to further modify them into an almost exact copy of the 767 gauges. The modification of these gauges was perhaps the single most difficult thing I did with this panel.

I continually update this panel as I learn new things, which is why we have version 6.2 of the panel. Every time I put up a revision, I think I can't possibly improve this panel. I keep proving myself wrong.

Other Panel Designs

My 767 definitely represent the most effort I have put forth to date. In between updates I have found the time to make a few other panels that employ the same techniques described here plus a few new ones. And as I learn things in my new creations, I always go back and apply the knowledge to the 767 (I just can't leave well enough alone). My latest new panel is for the DC10.

The DC10

This panel is unique because it is what I call "Semi-photorealistic." Many of the photorealistic panels you find on the internet have instruments that are basically unusable for IFR. And many times they place you in the jumpseat rather than in the pilot seat. When I started the DC10 project, I was drawing all the components by hand, just as I did for the 767. That was until fellow FPDA member Konstantin Prokopiu supplied me with very high-quality KC10 (military version of the DC10) pictures.



e-mailed me to say that this was the single biggest improvement I ever made to the 767 panel. I tend to agree.

Now I could turn my attention to the EADI. Using the panel layer



The DC10 panel is unique because it is what I call "Semi-photorealistic."

I had yet another revelation. I wanted to make the panel photorealistic, but I also wanted it to be readable. So I started the semi-photorealistic process. This involved first creating a hand-drawn background panel. Then using **Paint Shop Pro** I would grab an instrument background from the photograph and "resample" the size to what fit my needs. The resampling process involves increasing the color depth of the image to 16 million colors. Then after resampling the size you have to convert back to 256 colors. I then inserted the instrument background into the panel and retouched it to blend with the hand-drawn background. Every single gauge on this panel has been edited pixel by pixel. It's a painfully slow and tedious process that yields fantastic results.

The only major obstacle now was the transition from photorealistic gauge housings to the gauges themselves. My solution was to dim the bitmaps of the gauge files to make them less pronounced. This seemed to make the transitions smoother.

The DC10 autopilot also presented some interesting problems. Mainly, since it is an old plane, I had to modify the autopilot for use with FS98. And this brings me to an important point that must be remembered by all designers. You must make panels that are functional in the simulator. Take a look at the real autopilot for the DC10

versus the FS98 version I have put together.



KC10 Actual Autopilot



DC10 FS98 Autopilot

As you can see, there are some changes, mainly the Autothrottle system and the Altitude selection system. I have made an effort to make the autopilot as easy to use as possible without deviating far from the actual airplane. I also made sure that the numbers are easy to read. This involved some time-consuming photo editing.

The Saab 2000

I mentioned this panel earlier because it was with this panel that I first created the ARC mode for the HSI. I really like this panel because I believe it is the first glass cockpit

design that you could actually fly IFR with. I just recently released version two of this panel, which features a very realistic VSI gauge that I put together using the default VSI. I believe this is a most important gauge that is missing from many glass cockpit designs.

This design deviates from the actual Saab 2000 in a few ways because, again, I was concerned with functionality in FS98. For example, the real plane does not have a separate RMI gauge. I added it here because in the sim it makes navigation from point to point much easier.

From a design standpoint this panel created some interesting problems. The most obvious one is the number of gauges I had to fit into the EADI. There are six gauges all in that one CRT, and the interaction caused a design nightmare. So, making use of three panel layers, I was able to construct this glass cockpit. The very bottom layer has the VSI, HSI, Autopilot enunciators, Glideslope and OMI gauge. The middle layer is the EHSI ARC mode. This needed its own layer

because of the size of the HSI (it was interfering with the EADI components). And the last layer is the top panel with everything else.

One problem with this panel is that it creates really bad frame rates on slow



computers. This is another important aspect to keep in mind when designing a panel. More gauges equals bad frame rates. In this case it is not the number of gauges that causes this, but the size of the ARC and the number of panel layers. With this panel, there really is not much of a solution to the frame rate problem other than buying a faster computer. So, a big trick in panel design is to balance your goals for the panel with functionality. In this case I opted to take penalties in order to maintain the realism.

Panel Design Checklist

I have presented a lot of information here about panel design. I would like to sum up the main points you must consider if you decide to design panels of your own.

The first step is to visit the Microsoft **Flight Simulator 98** Web site to get the latest Panel SDK. This program has detailed information about the structure of the panel.cfg file (the file that creates the panel attributes) and gauge programming. It also has good information on the colors that can and cannot be used in FS98. There are limitations, and it is important to know these.

The second step is to get the utilities you need. They are available at the larger flight sim Web sites. You will need these utilities from Chuck Dome: **Gaubmp** and **GauMod98**. These allow you to modify existing gauges. You will also want to get an excellent utility by Benjamin Chen called **Gaubzr10**. This is one of the easiest gauge browsing utilities I have used. You can find all of these utilities at <ftp://wings.ark.com/wings/fs98/utility>. You will also want to invest some money in **Paint Shop Pro** for your graphics editing.

When you start the design process, you should research the panel you are trying to make. Look on the internet for pictures or diagrams. A good place to start is at Z's Cockpit Page, at [http://](http://www.mlink.net/~calypso/cockpits)

www.mlink.net/~calypso/cockpits. This way you can formulate the background picture and get an idea of what the gauges should look like.

Once you have drawn the background, you must find some good gauges. An excellent location on the internet for these is at <http://www.flightsim.com> in the file libraries section. Or you can try to create what you need using those supplied with the sim. But more often than not, another designer has already created nice gauges from the default sim gauges. Always respect the efforts of other designers, and get the approval of the designer that has taken the time to improve a stock FS98 gauge. Also, many good programmers have created additional gauges for use with FS98, and most of them are freeware.

Remember these points when designing panels. Always make your panel functional for the simulator. A good-looking panel that is impossible to fly on instruments is not a good panel (unless you are creating a VFR-only panel). Make sure that the layout makes it easy to use. Consider the impact on frame rates when adding gauges. Remember that more gauges create slower the frame rates.

I will mention one other thing that I have not touched on, and that is screen size. Generally, the higher the screen resolution, the better the panel will look.

If you design your panel in 1024x768 resolution and switch to 800x600 resolution, you may be shocked by what you see. The digits and some of the graphics may look distorted or even unreadable. If you design a panel for release to the public, you should make note of what resolutions your panel works in.

I design all my panels in the 1024x768 resolution and try as much as I can to make them compatible in 800x600. As a general rule, if you design in the higher resolutions, your panel will work in all full-screen

modes. If you design in the lower resolutions, your panel should work in all modes.

Final Thoughts

As a working pilot, you may ask where I get my motivation to "fly from home." Well, I would like to convince American Eagle to let me do my trips virtually, but I am sure that will not happen in my lifetime.

So, I do the next best thing. I get satisfaction from seeing a panel that I designed in my little "hut" in New Jersey being used and enjoyed around the world. I am also very proud to be offering some of the most realistic panels available. And this brings me to a very important conclusion. Share your designs with the flight simulator world. We all gain satisfaction from using the many wonderful add-ons for this great hobby.

Using different panels most likely adds the most enjoyment, next to good scenery. And if we can generate more interest in this product, we can hope that Microsoft will continue to develop it. That way we may all be able to look forward to more and more realism to come in the virtual flight world.

Panel Utilities

<ftp://wings.ark.com/wings/fs98/utility>

Eric's Panels

<http://www.flightsim.com/efpanels>

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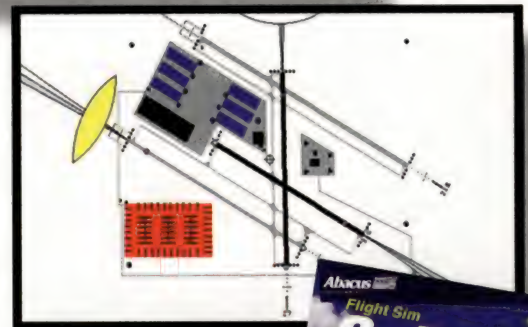
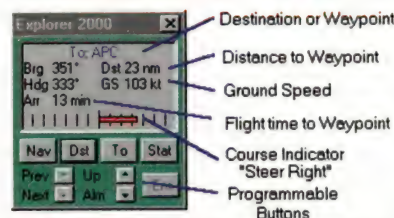


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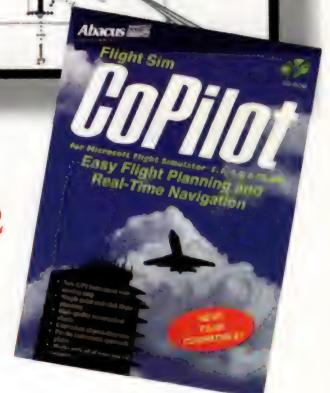
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The Virtual Hanger

VFR Flight Essentials

By David Lewis

In this column, over the next few issues, we'll look into the development of navigation and flight planning, from the earliest days of biplanes with road maps in the cockpit to the latest jet airways. Along the way there will be detours into various aspects of aviation, including charts, weather and controlled airspace, and exercises for you to practice on your simulator. By the end of the journey you should be able to

find your way safely from A to B in the simulated world.

Our journey starts in the early days of aviation. This is a nostalgic 1919 flight, and you want to take a Sopwith Camel from Concord Buchanan to Half Moon Bay, in California. How will you find your way? Use an atlas or a road map, and look around for the landmarks—there are plenty of them on this route. For realism's sake, there are no radio aids or radar services to use.

So, dig out your silk scarf and flying helmet, and let's go!

Flight #1: Concord Buchanan to Half Moon Bay

Start the simulator and select Buchanan, Rwy. 32R, in the FS98 California menu. You are in the San

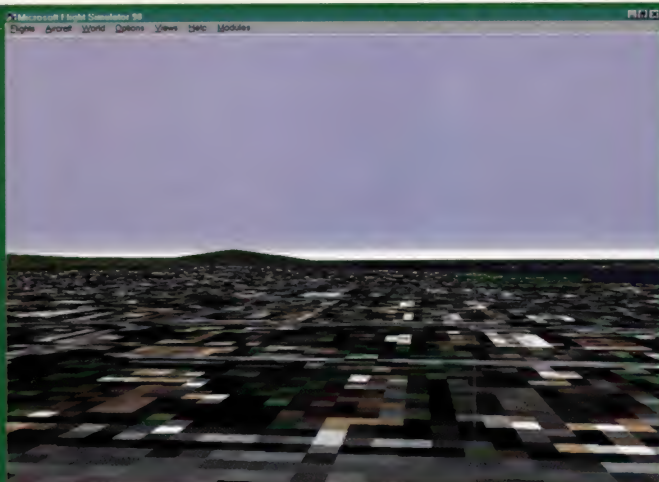


This is a nostalgic 1919 flight, and you want to take a Sopwith Camel from Concord Buchanan to Half Moon Bay, in California.

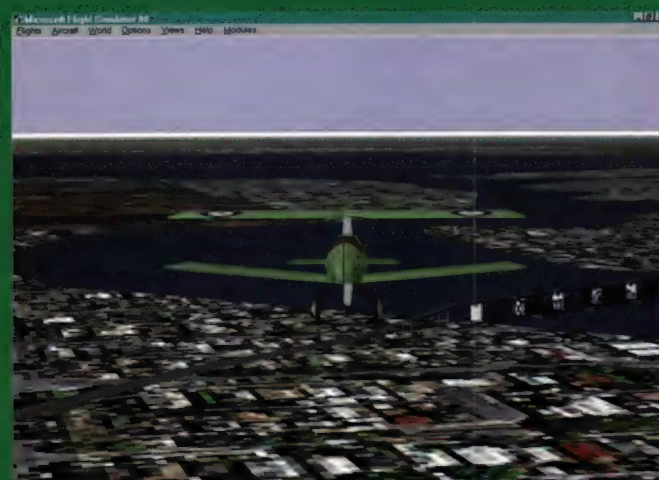


Start the simulator and select Buchanan, Rwy. 32R, in the FS98 California menu. You are in the San Francisco Bay area.





Take a look to your left, and you should see a long ridge. That's the Berkeley Hills, your first landmark.



To the right of the hills you will see San Pablo Bay, the junction of Interstate 80 with Interstate 580, and the Richmond-San Rafael Bridge.



As you pass the hills, head for the pale green ridge in front of you. At its left-hand end you'll find the Golden Gate Bridge. Landmarks don't come any better!

Francisco Bay area. Next, set the time to daytime (dawn would seem appropriate for this "dawn patrol"

flight). Finally, select the Sopwith Camel, and you're ready to go! Take a look to your left, and you

should see a long ridge. That's the Berkeley Hills, your first landmark. Now, full throttle and take off. Watch out for the nose swinging from side to side as you roll down the runway, and correct with the rudder.

At 400' turn left, and head for the right-hand end of the Berkeley Hills. Make a steady climb to 2,000 feet. To the right of the hills you will see San Pablo Bay, the junction of Interstate 80 with Interstate 580, and the Richmond-San Rafael Bridge. As you pass the hills, head for the pale green ridge in front of you. At its left-hand end you'll find the Golden Gate Bridge. Landmarks don't come any better!

Cross the bridge to the city and turn to 164 degrees to follow the Pacific coast South. State Highway 1 runs along the coast, and the city's sights are clearly visible: Golden Gate park and Lake Merced. As the highway rounds a ridge sticking out into the ocean, you'll see Half Moon Bay and the airport lights ahead. Happy landings!

This kind of navigation, by visual recognition of landmarks, is called "Pilotage." It's easy to dismiss it as trivial, but it's a valuable support to any other method of navigation. Even when you're flying by GPS-linked autopilot, you should still be looking out of the window to confirm your position.

The lack of specific mapping for airmen appalled E. B. Jeppesen; he was an airmail pilot for Boeing Air Transport in the 1930s, and he kept detailed notes of the features visible along routes between airports. He published his original Airway Manual in 1934, and today his name is synonymous with flight charts.

For our second trip we'll turn the other way, and head North to Sacramento. We'll use a technique called "dead reckoning" for this journey, supported by a minimum of pilotage.

Concord Buchanan is 41 nautical miles from Sacramento Executive, on a bearing of 025 degrees magnetic. I

Flight School



Cross the bridge to the city and turn to 164 degrees to follow the Pacific coast South. State Highway 1 runs along the coast, and the city's sights are clearly visible: Golden Gate park and Lake Merced.



As the highway rounds a ridge sticking out into the ocean, you'll see Half Moon Bay and the airport lights ahead. Happy landings!

learned this by measuring it on a map, but you could get it from a computerized flight planner just as easily. We'll look at some of those in another column.

The Camel cruises at about 90 knots, which is 90 nautical miles per hour.

So, a journey of 41 nautical miles will take (reaching for calculator)—41 divided by 90 (that's hours) times 60 (to get it into minutes) equals—near 28 minutes.

Flight #2: Concord Buchanan to Sacramento Executive

Start the simulator and select Buchanan Field, Rwy. 32R. Next, set the time to daytime, select the Sopwith Camel, and you're ready to go!

Make a note of the time before you set off. Add 28 minutes, and that's when you should reach Sacramento Executive. Full throttle and take off, just like last time. At 400' turn right onto a heading of 025 degrees. Climb out to 2000' and try to hold a steady heading, altitude and cruising speed (90 kts).



E. B. Jeppesen was appalled by the lack of specific mapping for airmen. He published his original Airway Manual in 1934. Today his name is synonymous with flight charts.

Look around at the scenery, and ask yourself: could you fly this route by pilotage? Not on my scenery! On my simulator this area is clearly farming country, with no major roads, rivers, or any other landmark to point the way. Now you see why pilotage is so important as a support for any other method of navigation.

Keep an eye on the time. I first spotted Sacramento after 23 minutes in the air. Have you seen an airport? Excellent! But is it the right one? Sacramento Executive has a long runway 02/20, crossed by both 12/30 and 16/34. Get down and count the runways where you are. If you can't read the numbers don't worry; just line up over the strip and read the heading off your own compass. I sure hope you've found the right place, but you'd better land anyway, if only to ask directions!

So, with a little luck you've managed to fly point-to-point by dead reckoning. You may have used a little bit





Look around at the scenery, and ask yourself: could you fly this route by pilotage? Not on my scenery! On my simulator this area is clearly farming country, with no major roads, rivers, or any other landmark to point the way.



Sacramento Executive has a long runway 02/20, crossed by both 12/30 and 16/34. If you can't read the numbers don't worry; just line up over the strip and read the heading off your own compass.

of visual reference to find the right airport at Sacramento. Along the way there were no useful clues to your position.

This kind of flight plan raises a couple of other important questions. Will the Sopwith go that far? How much fuel will we need for the journey? It's all very well to know the way, and to recognize whether you're still on course, but it would be really handy to know that you can complete the journey safely. And how did I know that 90 knots was a reasonable cruise speed?

With a real aircraft you get a

comprehensive handbook, detailing cruise speeds (along with throttle settings, associated RPM and rate of fuel use). With a simulated aircraft you don't always get that level of support. So the next best thing is to find out for yourself. I won't go into detail here, because it's all available in my other article, "Homebuilder's Corner."

My tests show the Camel at 2,000' cruises easily at 90 kts, where the fuel used is 14 gallons per hour. That allows an endurance of less than three hours, with a range of 200 nautical miles. So these have been pretty safe hops, and could even be handled with less than

Sailors of the air

The word "navigation" originally meant "travel by ship." One of the most important aspects of sea travel is finding land at the end of the voyage, since there aren't always visible clues indicating the right direction to sail. This aspect of "navy-gation" became the new meaning of the word.

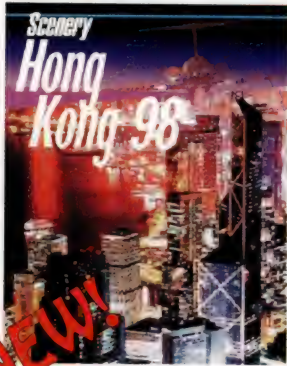
For centuries sailors have found their way by looking at the stars and by following a compass. Their methods are very similar to the dead reckoning described in this article. Flying has borrowed many words and ideas from the sea. On many boats the skipper steers from a "cockpit," and large ships in shallow waters such as harbors and rivers are usually steered by a local "pilot." In fact, many official publications refer to aviators as "air pilots" to avoid any confusion!

full tanks to start with. The Camel stalls (sometimes quite sharply) at about 42 knots, so a safe approach speed would be 65 kts. Now you have enough information to plan and fly a trip in the Camel safely.

Next time, we'll introduce the vagaries of the weather, starting with the wind, and advance into the '30s with the invention of the "radio compass."

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Using a road map

Flight planning can be done perfectly well using a road map. I have a Hildebrandt's travel map of California at a scale of 1:700,000, or about ten nautical miles to the inch.

Using a ruler and protractor, I can measure headings and distances, and make a pretty good job of things.

For pilotage, this is quite useful. Even better are VFR flying charts.

These are designed for pilots, and concentrate on features that are prominent from the air, such as towns, roads, rivers, airports and anything with lights on it.

Flying charts also show radio navigation aids and controlled airspace.

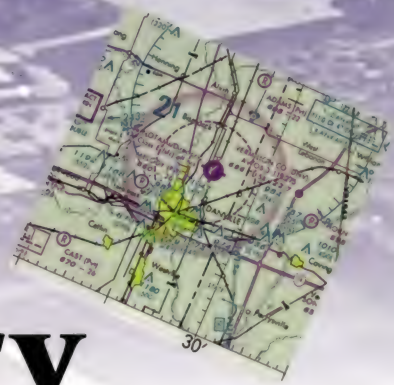
We'll be looking at these in more detail later in the series.



Scenery Design Corner

Designing and Making Scenery

by Justin Tyme



Part II Placing Your Airports

Every well-constructed house begins with a well-conceived plan built on a strong foundation. In the previous installment we laid this foundation and gathered our tools. We chose our lot (scenery area), obtained the blueprints (reference sources), gathered our tools (design applications), and prepared those tools for use (setup). Now we are ready to construct the framework in this and the next installment. Then we will add the “siding,” the “trim,” and do the “landscaping.” Finally, in the last chapter we will write the “brochure” and put our mansion “on the market.”

The framework of our scenery area consists of the basic structure of the scenery—the ground, runways, communications and navigational elements, without which, no matter how pretty it is, our creation would be

useless for all but spectacular screenshots. Remember that we are simulating actual flight as realistically as possible and not trying only to make pretty pictures on our computers. Appearances are secondary. A house may look terrific from the outside, but if it is poorly engineered it will soon collapse. Our intent here is to design a strong structure before we add the cosmetics. Today we’ll practice placing the airport in the scenery. In the next issue we’ll assign runways and navigation beacons to this airport.

Exclude areas

I have always found it desirable to set up the exclude areas at the outset, and then leave them alone. Every designer has his or her own method and

preference in this regard; mine is to totally bulldoze the default scenery and build from the ground up.

I have seen many scenery packages with umpteen zillion exclude files. FS98 seems to be immune, but FS95 has a real problem handling this many exclude files. They will inevitably cause kernel32 errors in FS95. Therefore, and in the interest of utility and simplicity, it is best to keep the number of exclude files at a minimum.

The problem is that exclude files *must* be rectangular. This can cause problems if your scenery area has an irregular shape. Some designers deal with this by constructing numerous, tiny exclude areas along the irregular borders. Sometimes this is unavoidable, but it should be the absolute last resort.

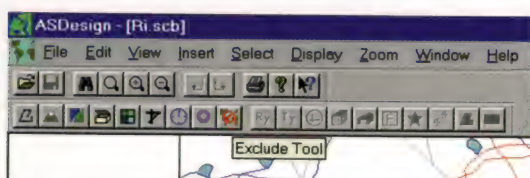
A better way to deal with irregular borders is to use a smaller number of larger exclude files and use layering to control what they exclude. If you are dealing with compatibility issues with an adjoining scenery area, you certainly do not want your exclude files to obliterate areas of the adjoining scenery. This will only frustrate your end-users and irritate your fellow scenery designers (not a good policy). You *can*, however, deal with this situation by specifying in your installation instructions that your scenery be layered below the adjoining scenery. This will neutralize the effect of the exclude files in those areas of the adjoining scenery

where your exclude file may encroach into that territory. Exclude files will only exclude scenery that is layered *below* it. It will have no effect on scenery layered above it. (Also, exclude files will *not* exclude synthetic tiles.)

Another way to deal with the problem is to open communications with your fellow scenery designers and cooperate. You may be able to negotiate these "border disputes" by agreeing on a common border based on latitude or longitude instead of the actual state or country boundaries.

For instance, I encountered such a problem between my Delmarva and West Virginia 98 sceneries. I discussed it with myself and agreed that it would be best to form a boundary at 79d30m West as a common border between the two sceneries. This was preferable to dealing with the WV panhandle and that part of southwestern Virginia south of West Virginia. The WV panhandle became part of Delmarva, and the southwestern part of Virginia became part of WV98. This made it possible to construct one large exclude file instead of many tiny ones conforming to the actual state borders.

In any case, when dealing with exclude files, less is better. Every situation is unique. You should figure out a way to accomplish your goals using the smallest number of exclude files possible.



While considering all these things, let us get our exclude files out of the way first. With ASD open in Map View, click the Exclude Tool. Click your left mouse button in the northwest corner of your scenery and drag it to the southwest corner and release, following the general shape of your scenery area as closely as possible. Double-click on the exclude boundary and set the

exclude parameters. Since I am bulldozing the default scenery completely, I checkmark all four boxes.

Note: If you now exclude the nav aids (i.e., VOR, NDB and ILS transmitters), you will have to add them all back in later.

If need be, create other exclude files as needed, but again, keep them to a minimum, except in those cases where they are absolutely necessary. Once your exclude areas are created, save your map.

Airports

The basic and essential element of any scenery project is, of course, the airport. And the basic and essential element of the airport is the runway. The runway is where it all begins (and ends). The two elements that may be attached to the runway are an ILS and a Menu entry. An ATIS message may be attached to an airport.

Before we can do anything, though, we must create an airport. We can create an airport in any of three ways. We can build one from scratch, we can use the ASD Wizard, or we can import an airport that already exists in Flight Simulator. Since the areas I usually work with are well covered in FS98, I prefer to use the Import method. If, however, you are working in an

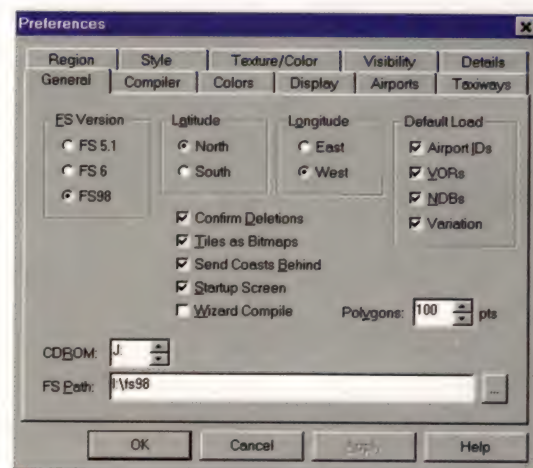
area not as completely represented, you will most likely have to build your airport from scratch. The Wizard method is also a quick way to create an airport, but there are some caveats to this method which I will cover shortly.

In the last issue we created our ASD map (.scb) and set up all our global preferences and map properties. Let us begin now by opening our ASD map file. Pull down the **File** menu, choose **Open**, find the .scb file you will be working with and double-click

on it. Alternately, if you have been following along from the first installment, you will find the last four .scb files you have opened listed at the bottom of the **File** menu. Find the file name and click on it. You should now see your map displayed on the ASD working screen.

ASD Wizard Caveats

I won't go into detail about how to use the ASD Wizard since it's covered in the ASD manual, but I will mention a couple of things we should be concerned about when using the Wizard. First, the Wizard by default will compile and copy the airport directly into the main scenery directory. This will work fine if you are just making a simple airport, but it is definitely *not* recommended for a major scenery project. For our purposes, there is a simple work-around to this default behavior. Pull down the **File** menu and choose **Preferences**. Under the General tab, make sure Wizard Compile is unchecked. Click **OK**. That's it. The Wizard will now *not* compile and copy an airport .bgl into the main scenery directory, but will instead create an individual .scb file for the airport



Uncheck "Wizard Compile"





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which, after clicking through the Wizard, you will find in your ASDesign directory.

Now we will append the airport to our map. Pull down the **File** menu and choose **Append Map**. Make sure you have “.scb” in the “Files of Type” box. Now find your ASDesign folder and you should see the .scb the Wizard has just created. It will be the airport identifier code with an .scb extension. Double-click on it and the Wizard airport will be appended to your map. You will see a dark blue dot surrounded by a rectangle. Zoom in and center your airport on the screen. We must delete two elements here. First, we should delete the rectangle surrounding the airport. Right-click on the rectangle and choose **Edit**. Now right-click on one of the handles of the rectangle. Making sure the Edit field is checked, click **Delete**. (ASD Tip: By making sure the Edit field is checked, we can avoid deleting a different region that we may not want to delete. By setting the region in Edit mode, we can ensure that we have captured the correct region if the Edit region is checked on our second right-click. Another way to safeguard against deleting an unintended region is to turn off the display of every region but the one we are working on now. Pull down the **Display** menu and uncheck everything but Airports.)

Now there is another element we need to get rid of. You cannot see it because ASD does not display Exclude Areas by default. Pull down the **Display** menu and make sure **Exclude Areas** is checked. After doing so you will see a rectangle with a thick, orange border surrounding the airport. Using the same method as described above, delete this exclude area.

Depending on the scope of your scenery project, you will follow the above procedure for each of your airports. You may decide to do them all one at a time following the above cycle, or you may decide to create all your

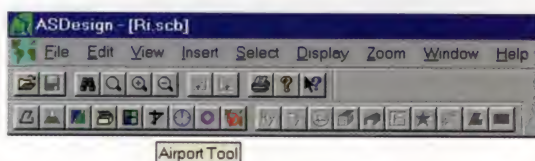
.scb files with the Wizard first, then append them to your map. Either way will work.

Another caveat to using the Wizard is that its data is not 100% accurate. Most of the airports are correct, but I have found some that were not correct, so it is a good idea to check the Wizard's airport against published airport data and make corrections where necessary.

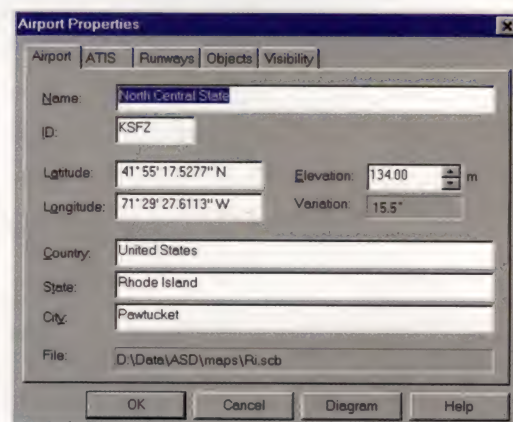
Creating an airport from scratch

This is the preferred method for the purists, and one every designer should learn. There will always be cases where an airport is missing from the default scenery so there's nothing to import, and many airports, especially outside the USA, are not included in the ASD Wizard database, so creating an airport will be the only choice.

In the first installment we mentioned our reference materials, including JeppGuides, Terminal Procedure charts, and online at AirNav.com. Now we will put these materials to use. In your reference source, find an airport within your scenery area. With your map open in ASD, click the Airport Tool. Your cursor will change to an airport symbol.



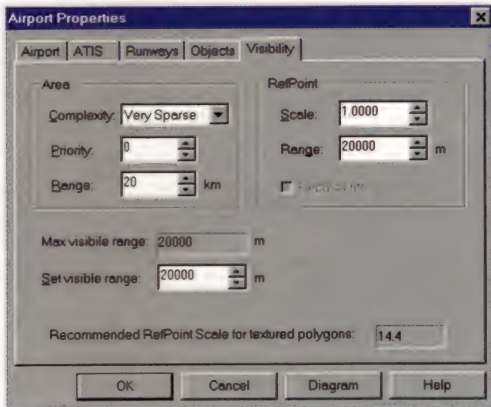
Find the airport's latitude and longitude in your reference source and move your cursor until it is within a few minutes of that latitude and longitude. Right-click, center, and zoom in by depressing the plus '+' key a couple times. Fine-tune the cursor's position and left-click. This places the airport at the cursor's position.



Now, it is unlikely that you have gotten the latitude and longitude exact, but do not worry about it. We will take care of that right now. Right-click on the airport you have just created and choose **Properties**. If you have placed the airport sufficiently close to its published position, ASD will have already placed the ID of the airport. However, if your airport is not included in ASD's internal database, fill in the ID and the Name fields. Using the information in your reference source, fill in the exact latitude and longitude. Also fill in the field elevation (remember: this is in meters—a good unit converter comes in handy if your reference source does not list the elevation in meters). Click the Visibility tab and make sure to change the Set Visible Range to 20,000 meters (see figure on top of next page). You'll notice the Area Range changes to 20 km. Do not worry about the information under the other tabs for now. We will deal with them later.

Click the Diagram button. This will take you from Map View to Airport View, or what I call “Detail View.” You will notice that a different set of Toolbar buttons has become active. Click the Runway Tool. The cursor changes to a small cross.





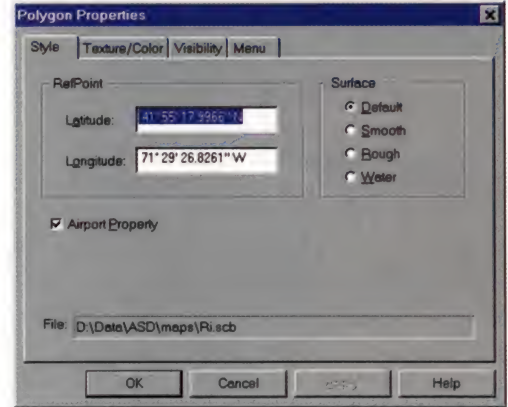
Importing an existing airport

I have used this method since FS98 was released. FS98 includes nearly 3,000 default airports, and fortunately, the areas I work in are very completely represented. I have also found that the runways and taxiway configurations are for the most part very accurately portrayed. Therefore, the Import method lends itself very well to my scenery projects. It is the method I prefer and the method I recommend if you are using FS98 and making scenery for the USA. Those of you outside of the US will probably be creating most of your airports from scratch.

The Import method is also the best way to deal with the new FS98 Airport & Facilities Directory (AFD). ASD supports the new section 20 file format (what we know of it at this point), but there are complications. I have generally managed to avoid those issues by importing the existing default airports. The biggest issue is that if you use ASD to create your own AFD files, there will be duplicate entries in the FS98 AFD. This isn't a major problem, but will likely cause confusion for the end-user. By importing the existing default airports, then *not* creating an AFD in ASD, you avoid the duplicate entries and still allow the end-user to access your airport through the FS98 menu system.

Importing an existing default airport is simple and quick. The first step is to load the existing .bgl's into ASD. Pull down the **File** menu and choose **Open BGL Files**. In the dialog box that appears, find the directory containing the default scenery files covering the area you are working in.

For instance, if you were creating the state of Rhode Island, you would find the USNE scenery directory. Make sure both Airports and VORs, ILSSs, and NDBs have checkmarks beside them,

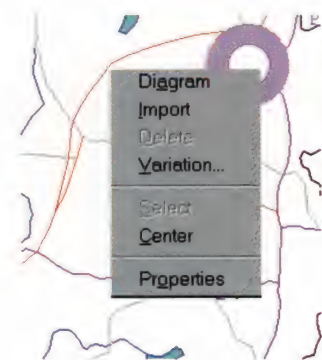


Right-click and drag to the approximate heading and length of a runway, according to the information in your reference source. Release the mouse button and you have your runway. Right-click and drag the runway so its center is on the crosshair, which represents the lat/long coordinate that you specified under the Airport tab of the Airport Properties dialog box. (I will be more specific later about what we are going to do with this. Here I am simply giving the procedure for creating an airport from scratch.) Click the Polygon Tool and draw an Airport Property polygon around your runway. Right-click on the polygon and choose **Properties**. Put a checkmark beside Airport Property (see illustration on the right), designate an appropriate texture, designate the color Green f021, and click **OK**. Now close the Detail View window by clicking the "X" in the upper right to return to Map View.

At this point you should receive a warning box telling you there is no synthetic tile for your airport. Click **OK**, then click the Tile Tool. Move the cursor to your airport and left-click to place the tile. Choose a synthetic texture appropriate for the area surrounding your airport and type in a value to match the elevation of your airport. That is the simple procedure for creating an airport from scratch.

and put a checkmark beside Tiles, too. Click the **Add All** button, then click **Open**.

ASD will take a couple minutes to load all the airports in the northeast US. When ASD is finished loading the airports, you will see them displayed in the Map window. To minimize the graphical confusion, pull down the **Display** menu and uncheck everything but **Airports**. You should now see the outline of the state of Rhode Island and all the default airports.



Right-click on one of the airports and choose **Properties**. You will notice that all the fields are filled in but grayed out. Click **OK**. Right-click on the airport again and choose **Import**. Apparently, nothing has happened. *Wrong*. Right-click on the airport again and choose **Properties**. All the fields have now become active, indicating that the airport is now part of your map, and as such is capable of being edited. Click **OK**.

Scenery Design Corner

(**ASD Tip:** Now depress **[Ctrl] + [B]**. This toggles the display of the .bgl files. Depress **[Ctrl] + [B]** again. Now depress **[Ctrl] + [U]**. This toggles the display of the User files. The airport has disappeared because it is now a “user” feature and not a “BGL” feature. This is a handy way to prevent confusion if you are working on a large state with a great number of airports. As you import the .bgl airports into your map, they will no longer appear as .bgl airports. If you want to see which airports still need to be imported, simply toggle they display with **[Ctrl] + [B]**. When you toggle the display and no more airports appear, you have imported all the airports.)

Continue right-clicking on every default airport in your scenery area until they are all imported. Now pull down the **Display** menu and put a checkmark beside **Tiles**. You will now see the default tiles we loaded. We will import the tiles *only* under each airport. When you are done, toggle the display with **[Ctrl] + [B]**. You will now see the

airports and tiles we have imported. After all that work it's a good idea to save the map. Depress **[Ctrl] + [S]**.

(**ASD Tip:** Save your map often! You never know when something could go wrong. There's nothing more frustrating and disheartening than when you've just performed two hours worth of meticulous work and your computer crashes or freezes, and it all goes swirling down the drain. Believe me, it has happened to me, and it *will* happen to you. I have learned to save my map every few minutes just in case.)

Whichever of the three methods for creating airports you've used, you have now placed all your airports and have placed a synthetic tile under each one, set to identical elevations. At this point, we should compile our map to be sure we have no errors.

Depress **[Ctrl] + [S]** to save the map. Pull down the **Display** menu and make sure all the region types are displayed. Pull down the **Select** menu and choose

All features. Pull down the **File** menu and choose **Create Scenery Files**. Put checkmarks beside everything then *remove* the checkmark from Airport Facility Directory. Put a checkmark beside Banding. Click **[Compile]**.

If you have set up your paths properly in Preferences and Map Properties as we did in the previous installment, all your source files and .bgl files are now in the processing directory we set up then. Now execute the batch file we created in the previous installment to copy the .bgl files to the scenery directory. Get up and walk around, make a cup of coffee, have a soda, take a nap. Get away from the keyboard for a few minutes. Take a well-deserved break.

In the next issue we'll complete construction of our airport by placing runways and navigation beacons and fine tuning the elevation of the airport. We'll also show you how to beta test your airfield to exorcise the gremlins. After that, following installments will add visual details to your airport, design adjoining cities and bring the scenery to life with dynamic scenery objects, so stay tuned to this frequency.

Coming In Future Issues

Stay tuned for these exciting articles in the next issue of *Full Throttle*

- ➔ 3D Video Card Review
- ➔ GPS Technology 0 Real World and FS
- ➔ WW I and WW II Flight Simulators
- ➔ Air Warrior III
- ➔ Flying Corps Gold
- ➔ Red Baron
- ➔ Others
- ➔ Flying by Moonlight – WW II in the C47
- ➔ Save-a-Connie – world's last flying Super Constellation
- ➔ Restoring a Vintage DC3
- ➔ VFR Flying Features
- ➔ Propellerhead Product Review



Follow along as we share a story on restoring a Vintage DC3 in an upcoming issue of Full Throttle

- ➔ Scenery Design Corner
- ➔ Creating Flight Sim Textures
- ➔ NOTAMS - the Latest Product Reviews



Feature Review

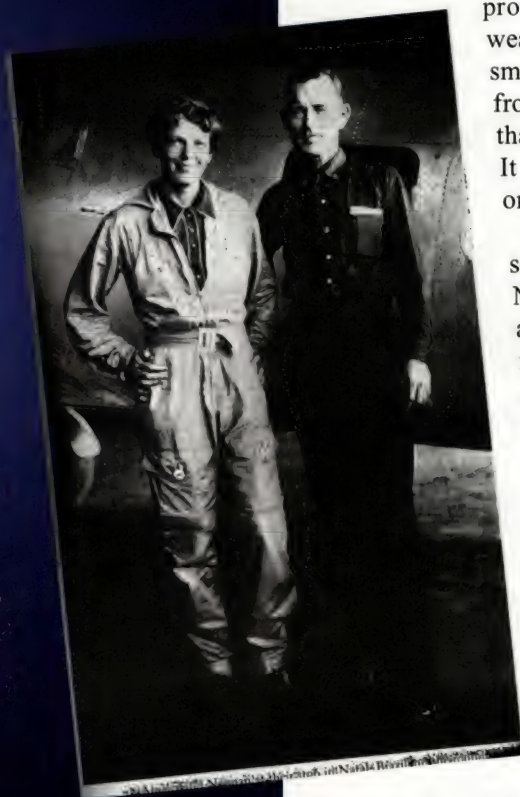
Around the World

Review by Phil Paschutine

8:44 a.m., over the Pacific:

"WE ARE ON
THE LINE OF
POSITION 157-337,
WILL REPEAT THIS
MESSAGE ON 6210
KCS.WAIT,
LISTENING ON
6210 KCS.WE ARE
RUNNING NORTH
AND SOUTH."

*The last documented words of
Amelia Mary Earhart, July 2nd,
1937.*



I won't guess what happened on that July 2nd morning. We know the *USS Ontario* was halfway between Howland Island and Lae, acting as communication relay and providing weather information. The Coast Guard Cutter *Itasca* was off the shore of Howland Island providing a radio direction finding target, weather information and sufficient amounts of smoke that would enable Amelia to see the ship from miles away. There was a radioman on Lae that maintained communication with the plane. It seems Earhart's Electra had enough fuel onboard to complete the flight.

Abacus's *Around the World* theme scenery recreates the (in)famous Earhart-Noonan flight. Scenery designers Tim Dickens and Justin Tyme have gone to great lengths to recreate the flight areas and airports in 1930's realism. Justin designed the area from Oakland, California (Earhart's departure field) to Natal, Brazil. Tim crafted the regions from Africa to Pearl Harbor, Hawaii, and the 3-D macros. For those of you who do not frequent the Internet or CompuServe, Tim Dickens and Justin Tyme are well-known figures in the flight sim community, and they excel at what they do. David Lewis and Chuck Dome, two more well-known designers, created the authentic Lockheed L-10E Electra and panel from scratch. Luis Vieira de Sa created some of the 3-D static aircraft. Avid simmer will want to grab ATW based on this star power alone.

Install

As always, installing an Abacus program is as easy as one mouse click.

Around the World was created in part by Tim Dickens, *Full Throttle*'s Managing Editor. It's distributed by Abacus. *Full Throttle*'s publisher Arnie Lee is also CEO of Abacus. Phil Paschutine is an independent author.

Around The World

This particular install is accomplished in two steps: scenery first, then setup depending on your FS version. *ATW* works with FS5.1, FS95 and FS98.

Because the scenery is so extensive, you must select "Around the

World" in the scenery library before starting a flight. This ensures that FS doesn't get confused between the *ATW* and default FS sceneries.

Manual, maps and charts

The 50-page manual is well done and includes pictures of the route. Complete flightplans are ready to guide you through the entire route (over 25,000 miles!), illustrated with screenshots of the airports you'll visit. However, due to the ink color used for the printing (an antiqued brown) the images can be difficult to see.

Three fold-out maps highlight the general location of airport in the country of destination. Each map lists all the waypoints and airports.

Generic charts would also have been a great help. The virtual pilot must fly without knowing the layout of each airport and of the surrounding area in *ATW*. This can make some of the flights very adventurous as you fly into an unfamiliar area.

The Plane

The Lockheed L-10E Electra is one tough baby to handle. It's not as easy as flying the Cessna! So, take some time to familiarize yourself with it before starting your journey. Take on half a fuel load and fly the warm up from the Burbank Lockheed factory to Oakland to get a feel for the

Electra. You will find the Electra spec. sheet and flying tips on pages 14-15 of the manual.

The onboard navigation equipment is also true to the era, including a master aperiodic compass, a bubble sextant and a pelorus fitted on both windows. (Readings made with the bubble sextant were done through flat, distortion free glass panes located in the bulkhead). A Pioneer Drift indicator, altimeter, air speed indicator, and temperature gauge are incorporated into the panel as well. Forget about

doing any kind of celestial navigation in FS J. Rely on the ADF and compass navigation instead.

The scenery

Being theme scenery, *ATW* follows the route filed in the 31 flight plans. Stray too far from your course and you'll find yourself flying over the default FS scenery (if any); you can get lost if you wander too far out!

A lot of the flying is done using compass navigation, so the pilot should **at all times** stay on course. There are plenty of geographic features to see along the way.

Some extra airfields were added along the route for those who do not feel like flying long legs during the journey. Ten of the longest flights average 1,490 miles! The route circles the globe near the equator for a total flight distance of 25,193.8 nm. The shortest leg is 98.4 nm; the longest and last leg is 2,224.4 nm, from Wheeler AAF (Hawaii) to Oakland.

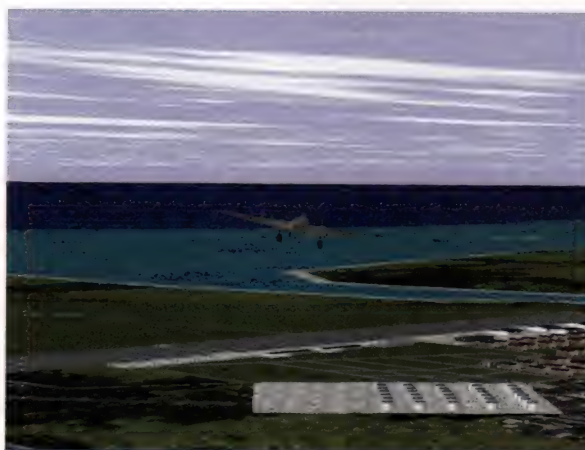
Hawaii was a project in itself and this is what Tim has to say:

"I had the benefit of quite a few aerial photographs before/after the Pearl Harbor attack, which helped quite a bit. Hickam Field, Ford Island, Wheeler Field, Barber's Point and the Naval Air station on the western side of Oahu appear exactly as they did back then".

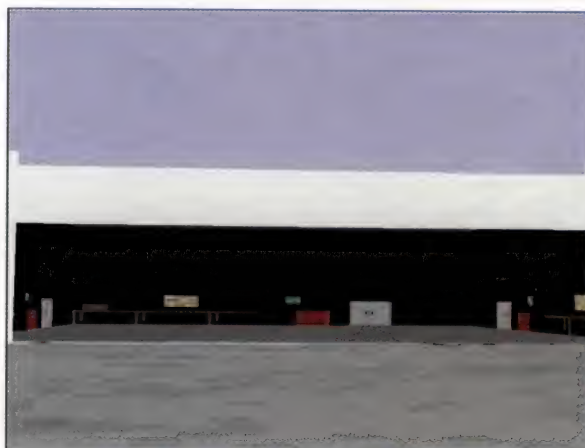
Nav aids

The route is marked by NDBs all the way. Range is limited, though, so use the magnetic compass between beacons!

If you own CoPilot (flight planner and plotter, GPS, moving map and airport chart generator) you will be able to use the charts



Hickam Field, Pearl Harbor, circa 1937



Have a look into the hangers and grab a couple of tools from the workbench



included in the CD-ROM. Of course, you may be tempted to use CoPilot's GPS. Well, DON'T! They did not have GPS in the '30s.

Airports

I did not have the airport charts of that time (assuming there were any for some of the remote airports), but the airfields do have that '30s look. Anyway, after several hours of intense flying, what the pilot is looking for is a strip (any strip) to land on. The manual explains how to reach each airport from the last waypoint. I do believe however that it would have been nice to include generic airport and loose-leaf area charts.

Present-day NOS charts showed the designers the location of the airports and the topography of surrounding terrain. Of course, since no detailed charts of the individual airports existed, Tim and Justin had it their own way and did quite an artistic job. The buildings are few but well designed, and some airports have interesting objects here and there. Have a look into the hangers and grab a couple of tools from the workbench.

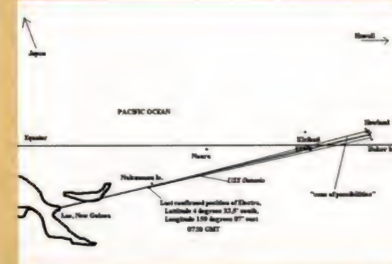
I also noticed that they used the runway marking convention of the time, which explains why there are so few. You will also see some of the early birds along the way, such as Boeing 247s, DC-3s and some biplanes.

Situations

Why mention the situations at all? For one, you must bear in mind that Earhart's departures were done mostly at (or before) dawn in specific weather conditions. This is another example of Abacus's attention to detail: the situations recreate the weather conditions and time of departure for each flight. My advice is to depart using the ATW situation, and fly the

The route:

- ➔ Burbank, CA, to Oakland, CA
- ➔ Oakland to Davis Monthan AFB, Tucson, AZ
- ➔ Davis Monthan AFB to Lakefront, New Orleans, LA
- ➔ Lakefront to Miami Municipal, Miami, FL
- ➔ Miami Municipal to San Juan, Puerto Rico
- ➔ San Juan to Caripito, Venezuela
- ➔ Caripito to Paramaribo, Dutch Guiana (Suriname)
- ➔ Paramaribo to Fortaleza, Brazil
- ➔ Fortaleza to Natal, Brazil
- ➔ Natal to Saint Louis, French West Africa (Senegal)
- ➔ Saint Louis to Dakar, F.W.A. (Senegal)
- ➔ Dakar to Gao, French Sudan (Mali)
- ➔ Gao to Fort Lamy, French Equatorial Africa (Chad)
- ➔ Fort Lamy to El Fashier, F.E.A. (Chad)
- ➔ El Fashier to Khartoum, Anglo Egyptian Sudan (Sudan)
- ➔ Khartoum to Massawa, Eritrea (Ethiopia)
- ➔ Massawa to Assab, Eritrea (Ethiopia)
- ➔ Assab to Karachi, India (Pakistan)
- ➔ Karachi to Calcutta, India
- ➔ Calcutta to Akyab, Burma
- ➔ Akyab to Rangoon, Burma
- ➔ Rangoon to Bangkok, Siam (Thailand)
- ➔ Bangkok to Singapore
- ➔ Singapore to Bandung, Indonesia
- ➔ Bandung to Surabaya, Indonesia
- ➔ Surabaya to Kupang, Indonesia
- ➔ Kupang to Darwin, Australia
- ➔ Darwin to Lae, Papua New Guinea
- ➔ Lae to Howland Island, U.S. (end of the flight for Amelia and Fred)
- ➔ Howland Island to Wheeler AFB, Hawaii
- ➔ Wheeler AFB to Oakland, CA



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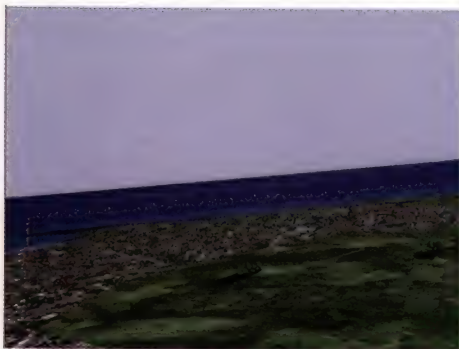


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Easter egg

If you set the scenery complexity to "Very Dense," you can see the present-day Honolulu International Airport and downtown Honolulu.

Conclusion

Around the World will please pilots who wish to recreate the historic Earhart-Noonan flight. Using the NBDs as the sole source of navigation and having to follow a magnetic course for hours on end is a very humbling experience. The airports have a definite 1937 "look," and one does feel a pinch when landing on Howland Island. Amelia and Fred did not make it, but when landing at Oakland, you will have a feeling of accomplishment and can almost feel that they too have made it.

To commemorate the 60th anniversary of the Earhart-Noonan flight, Linda Finch flew around the globe, starting from Burbank on March 17, 1997, completing the trip on May 28th, 1997.

leg. Then save the situation and fly the next leg when you wish (of course, don't expect to have the same weather). Or to be more accurate, load the next ATW situation for each leg.



Feature Review

GPS98: Global Positioning System for FS98

Review by Tim Dickens

Finding your way around FS 98 can be a job in itself. But finding the way to your next destination can be an even bigger challenge. To answer this challenge, David Drouin has created an excellent utility, **GPS 98**. This is a global positioning system (GPS) for FS98, which provides the user with two basic navigation functions and several types of navigation information.

The GPS 98 display provides information on your current latitude and longitude coordinates, and the coordinates and bearing of your target waypoint or destination. It also allows you to automatically fly from point to point, using the established FS98 navigation radio beacons and airports. Or you can define your own navigation points and add-on scenery airports.

Secondly, information including estimated time enroute (ETE), bearing to next way point, ground speed (GS) and runway/radio frequency information at your destination airport is displayed.

GS is used, rather than true air speed (TAS), because TAS represents the speed of the aircraft through the air mass that surrounds it, and since the air mass itself is moving, TAS does not correctly calculate the estimated time to your destination.

The truly unique feature of the GPS 98 display is that it is actually incorporated into a panel gauge within FS98, rather than as a separate Windows95 display window.

This allows the user to embed the GPS 98 utility directly into an aircraft panel, but even more importantly, it gives 3-D display users the ability to use it while in full-screen mode. This is not possible with utilities that use a Windows95 window interface, which can not be visible while FS98 is in full-screen mode.

Since most of the 3-D video cards presently available can not enable 3-D accelerator functions unless FS98 is in full-screen mode, GPS 98 provides

these users with GPS display capabilities not possible with other programs.

Installation

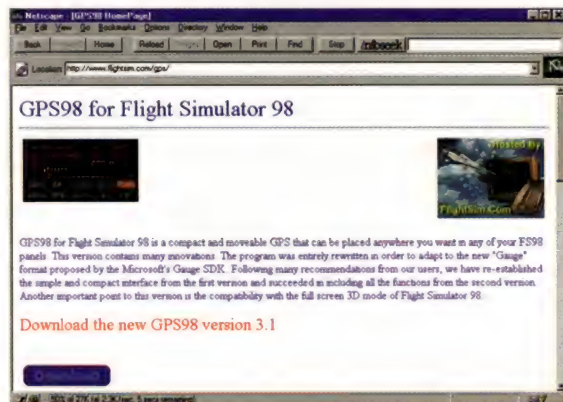
Before installing the GPS 98 utility, make sure you have installed the FSConv98 (Patch 1.0) from Microsoft. If you do not have this patch installed, you can get it at the following site:

<http://www.microsoft.com/games/>
or at the Wings.ark site at:

<http://wings.ark.com/fs98.html>.

GPS 98 is incredibly simple to install and use. The setup program installs everything correctly into the proper FS98 directories. You don't have to struggle with finding the correct folders and moving files, etc. One thing

***GPS 98 v. 3.1 is available
as a shareware download,
available at [http://
www.flightsim.com](http://www.flightsim.com). Just
follow the links to the GPS
98 homepage.***



that a setup program can not be intuitive enough to do is to place the gauge in whatever panel(s) you want. Version 3.1 comes with an easy-to-use utility called "GPS98PNL," which will create a new panel window with the gauge in the aircraft panel of your choice.

But be careful where you install the gauge. As an example, if you want the gauge to operate with an aircraft that is utilizing a panel from another folder, such as one in the folder FS98\FSFSCnv, you must be sure that you install the gauge into the *actual target panel folder in the FS98\FSFSCnv file*, not the Panel.cfg file for the aircraft, where the panel is described using the alias= command.

If you want to do a custom job yourself and embed **GPS 98** directly into your favorite aircraft's main panel, you will need to manually install it, since this is a gauge and not a utility that runs through a Windows95 window interface. Before you say "Oh my God!" let me show you a couple of easy ways to do this.

Installation as a separate gauge window

By "window" I do not mean a Windows95 window, which operates independently from FS98. I mean an FS98 panel gauge window, similar to the way the "avionics" switch on the default Cessna 182 RG works, or one which can be called up in the FS98 **Views | Instrument Panel** menu. By way of example, we are going to use the Cessna 182 RG aircraft to illustrate how to do this.

If you would like to install the gauge as its own, independent window, simply use the **GPS98PNL** utility. It is simple to do, and will provide you with the GPS gauge whenever you select it from the **Views | Instrument Panel** menu in FS98.

Program listings used in this article

Program listing 1

```
[Window01]
file=Radio_Stack_bg.bmp
size_mm=170
window_size_ratio=1.0
position=8
visible=0
ident=50
```

Program listing 2

```
gauge00=Bendix_King_Radio.Nav_Comm_1, 0, 0, 130
gauge01=Bendix_King_Radio.ADF, 0, 43, 130
gauge02=Bendix_King_Radio.DME, 0, 73, 130
gauge03=Bendix_King_Radio.Xpndr, 0, 100, 130
gauge04=Bendix_King_Radio.AP, 0, 133, 130
gauge05=Gps, 0, 163, 112
```

Program listing 3

```
[Window01]
file=Custom_avionics.bmp
size_mm=600
window_size_ratio=1.0
position=7
visible=0
ident=50

gauge00=Bendix_King_Radio.Nav_Comm_1, 499, 126, 100
gauge01=Bendix_King_Radio.ADF, 499, 162, 100
gauge02=Bendix_King_Radio.DME, 499, 188, 100
gauge03=Bendix_King_Radio.Xpndr, 499, 214, 100
gauge04=Bendix_King_Radio.AP, 466, 38, 130
gauge05=Gps, 499, 71, 98
gauge06=Bendix_King.VOR2, 426,87, 62
gauge07=Bendix_King.ADF.Model_B, 426,167, 62
```

Want to do something a bit more slick? Why not install it as part of the avionics package, so it will come up with the radios when you press the avionics switch. Here is exactly how you do it:

Go to the FS98\Aircraft\C182\Panel.rg folder and open the Panel.cfg file. Find the portion that reads the text in Program listing 1.

Directly underneath you will find the gauges listed. We are going to shrink the size of the radios slightly, and place the GPS gauge directly underneath. Put a comma ',' in front of each gauge entry to "comment" them out. FS98 will now ignore those entries, but you can restore the original configuration later by removing the commas.





Figure 1:
Cessna 182 RG
Panel using GPS
98 v. 3.0 gauge.

Now, with the default entries "commented" out, replace them with the entries shown in Program listing 2:

Now, when you press the avionics switch, your panel display will look like Figure 1.

The only negative is the gray area of the panel bitmap behind the radios and gauge. Want a display that is even slicker? How about creating a custom avionics/GPS display that is embedded directly into the right-hand side of the panel. Using this technique, the gauges on the right side of the panel will be "replaced" by the radios/GPS display in such a way that it will look like they belong there. You can go back and forth by pressing the avionics switch. To do this, I highly recommend that you read the article *Customizing your FS98 Panels* in this issue. It will explain how to accomplish step 1: making a custom panel bitmap. This is done by copying the original Cessna182.bmp bitmap and erasing the non-used portion of the

main panel, leaving only the part we are working with. Then using cut/paste, erase the original gauge shadowing so that you end up with a .bmp that looks like Figure 2 (below).

Name it Custom-avionics.bmp, and save it in the FS98\Aircraft\C182\Panel.rg folder. Next, comment out the entire [Window01] entry in the Panel.cfg file, and replace it with the text in Program listing 3.

When you press the avionics button, your panel will look like Figure 3 (below).

Note that I also added a Vor2 gauge and another ADF gauge.

The actual sizing of the gauge is done by the last command in the gauge description string. In the above example, it is 98 mm wide. If you find that the gauge is too small to read the numbers, you will need to specify a larger width. This, of course, may

require that the other gauges on the panel be sized smaller so that the GPS 98 gauge will fit.

It's as simple as that. Obviously, you can re-arrange things however you want, but you get the idea. The versatility of the FS98 panel system gives this gauge a lot of possibilities.

Pushing the buttons

Operation of the gauge itself is a snap. The layout of the gauge is simple and elegant. All functions are almost self-explanatory, but I will outline them briefly:

Navigation Mode

Used to display current position, distance/bearing from active waypoint, current location, ETE, altitude, speed (GS), magnetic variation, wind speed and direction

Direct To

Used to manually select a new waypoint or target airport. Since this is a global positioning system, you are no longer restricted by the reception range of the FS98 navaid radio beacons. You can select a navaid all the way across the world if you want.

Information

Displays information on the active waypoint or target airport. Coordinates, navaid frequencies and runway information that is contained in the GPS 98 database can be displayed.

Route

Used to load a pre-configured set of up to 30 waypoints. As an example, you can define waypoints that set you up for

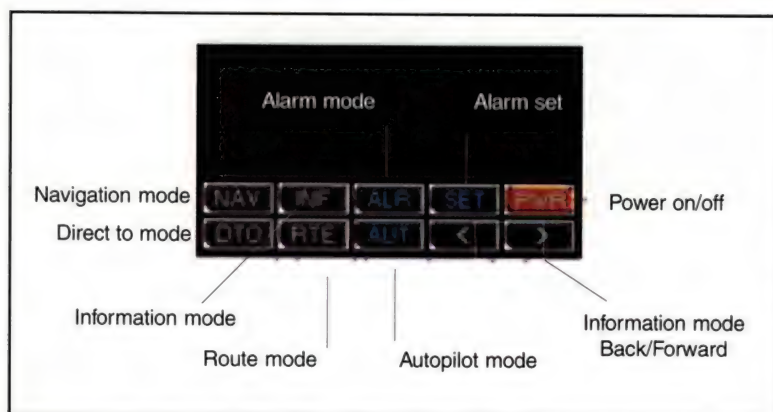


Figure 2:
Use cut/paste and erase
the original gauge
shadowing so that your
.bmp looks like this

Figure 3:
Cessna 182 RG
Panel using GPS 98
version 3.1 Gauge



Feature Review



the exact, ideal coordinates to make runway approaches at your favorite airports, like a real-world aircraft GPS does. This makes flying a lot easier!

Alarm

Toggles alarm on/off. Uses direct sound mixed with the default sounds of FS98. Alarm sounds when the aircraft enters a preset radius from the target waypoint/airport.

Autopilot Lock

Locks the aircraft autopilot to the active waypoint/target airport. Only the aircraft heading is controlled here. Speed and altitude must be selected on the autopilot control, as usual. Autopilot Lock will turn the aircraft as you reach each successive waypoint, and head for the next one. Once the last waypoint or target airport has been reached, the Autopilot Lock will turn itself off.

Set

Sets the alarm radius

Power

Switches unit on/off

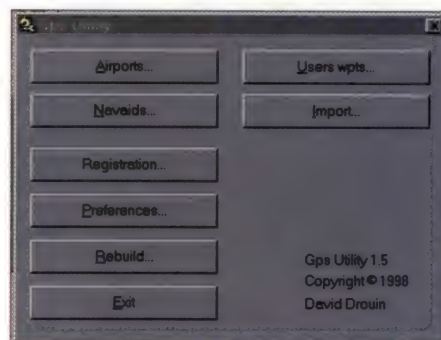
The GPS display indicates speed (GS) and distance to the current waypoint, along with ETE by calculating ground speed. In this way, a real time ETE is displayed when the simulator speed is increased on the panel clock, not FS time. When using the Route function, the display also shows the distance and ETE to the next

waypoint, along with time and distance from the previous way point. A scaled linear indicator shows the relative direction of the active

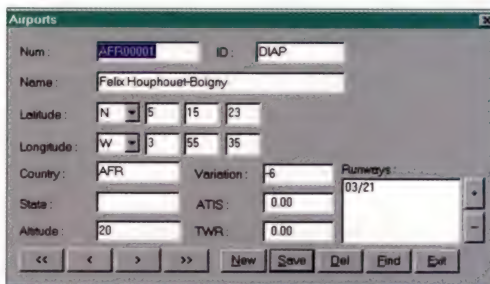
waypoint from your current heading.

The Database

The **GPS 98** database includes 6,761 nav aids, 3,791 airports and 5,869 runways—basically, the extent of the default FS98 scenery. A custom database for add-on scenery can be created via the **GPS 98** utility, which the setup program installs in the newly created folder FS98\Gpsdata. Double-click on the GPSUTILS application and the main menu screen appears:



You can add individual nav aids, airports and runways through this utility.



Using the import function, you can add larger database files in ASCII format. To build an ASCII database, follow the examples of the ASCII database files included with the program as a guideline, and take them literally. Use the same headers and amount of spaces outline in the examples, and **DO NOT** use the **Tab** to enter your data. I made that mistake on my first attempt at creating a file. The GPS utility is also used to load pre-defined sets of waypoints for retrieval later while flying using the Route function.

Conclusion

David Drouin's **GPS 98** utility represents a significant advance in add-on utility programs. It's ease of use, and its .GAU gauge format, allowing 3-D card users to utilize it in FS98 full-screen mode, establish a new benchmark in add-on utility technology. Now that David has shown us the way, perhaps a whole new world of 3-D capable add-on software will be coming soon. At least, we can all hope so.

GPS98 Utility

By David Drouin
Available as a shareware
download:

<http://www.flightsim.com>.

Follow the links to the **GPS 98** homepage.

Spotlight: Getting a Lift to School in Style

How's this for a dream job? Recently, 16 students were flown to their flight school 6,000 miles away aboard the supersonic Concorde.

International Pilot Training Centre. In December, WMU and British Airways signed a two-year, six million dollar contract in which about 48 pilots will spend 55 weeks at the IPTC and

undergo intensive training which will qualify them for flying positions with British Airways, the world's largest airline.

The event saw 50,000 spectators

crowd around the Concorde, which has landed in Michigan only one previous time. Among the greeters was Michigan's Governor John Engler. He sees the contract as adding to the economic development in West Michigan.

WMU is recognized as one of the top schools for aviation education. As part of the event, the Kelloggs Foundation announced a gift of \$5.2 million over three years that WMU will use for new aircraft, instructors, equipment and

improvements to the school's airport facilities. WMU's current fleet of 30 planes serves about 600 students at its main Kalamazoo campus and nearby Battle Creek Airport facilities.



The Concorde flares just before touchdown on Battle Creek's 10,000-foot Runway 23.

The special March 6th flight from London to Battle Creek, Michigan was arranged to highlight the opening of Western Michigan University's



WMU has 600 students enrolled in its various aviation education programs.



Publisher Arnie Lee logging a few hours in a Frasca simulator.

The WMU classrooms house several types of simulators. Among them are simulators for single- and multi-engine aircraft. Lab Director Jim Barrowman told us that the state-of-the-art Frasca twin-prop simulator costs \$400,000—pretty close to the cost of a real twin-engine plane.

For more information:

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Web: <http://www.wmich.edu/aviation>

Feature Review

Review by Tim Dickens

Descending through 9000 feet, you are locked onto the ground target outlined in your mission profile and setting up your attack profile. Suddenly, enemy MiG fighters are reported by your AWACS control, at constant bearing, decreasing range. You will be unable to eliminate your ground target effectively without first engaging the MiGs, preferably on your own terms. Your wingman drags left to draw their attention, and as predicted, the bandits are suckered and follow him to take an "easy shot," while you hit the blowers and climb fast, then break hard left to engage. The lead MiG is now wise to you and begins a complex series of ACMs (Air Combat Maneuvering) to avoid your RADAR lock, breaking hard right when you close to engage. But the MiG is no match for your Lockheed/Boeing F-22A, which fits you like a glove and responds to your input almost as though it is following your thoughts. The lead MiG breaks hard right again, but this time he has played right into your hands, and you have waxed his tail. RADAR Lock. Good Tone. Fox One! You break left to avoid the impact and explosion. The MiG is now in several pieces, and he punches out. Check six for the other MiG. He fared no better against your wingman. He's history. Turn right and head back to the target. The smoking hole that used to be your opponent

F22 Air Dominance Fighter

passes by your two o'clock. You acquire the target. Fox two! Fox three! Mission accomplished!

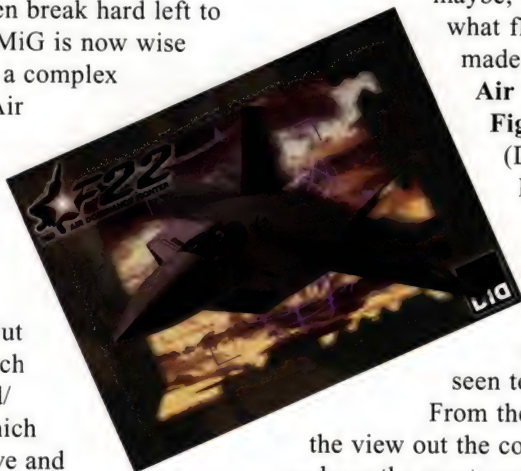
Just dreaming? Well, maybe, but dreams are what flight simulation is made from, and the **F-22 Air Dominance Fighter** from DID (Digital Image Design) comes closer to making that dream a reality than any other combat simulator I have seen to date.

From the flight model, to the view out the cockpit, **F-22 ADF** is perhaps the most sophisticated combat simulator ever released for the PC. Apparently, the panel of judges at the Milia d'Or Awards Ceremony in Cannes, France, agreed when they presented both the *Best Simulation* and the *Grand Prize Game* awards to the **F-22 ADF** simulator at their Awards Ceremony in February. This the first time the trophy for Best Game has ever been awarded to a simulation program at Milia.

Here are some of the reasons why.

Fast and simple installation

The install wizard guides you through the process flawlessly, and places all of the files in the right places. You are provided with a default file location in the Program Files folder on your hard drive, or you can specify a different location. The installation program offers the options of a Typical Install, which places all of the files on your hard drive, or you can select a Compact Install, placing only the program files onto your hard drive (the data files remain on the CD). 150 MB of hard drive space is required for the Typical Install. Another 50 Meg of space will be needed for a swap file, so you can consider 200 MB of drive space a must to run this program from the hard drive. Although it will run with 16 MB of RAM, it will build a very large swap file, and things will likely load much more slowly in this configuration. This is why 32 Mb of Ram is recommended, and given the graphics capabilities of the program, users with 64 Mb RAM will get their money's worth.





When starting the program, go to the Options selection and set up your screen resolution, level of detail and display effects, such as contrails, transparent clouds, etc. Lower-end systems or non-3dfx users can boost their performance by selecting low detail at medium resolution. Also, deselecting the music option can boost your performance as well.

Documentation

The manuals and quick guides which are included with the program can only be described as excellent. A custom-made 186-page manual entitled

Allies & Adversaries, which was made in conjunction with World Airpower Journal, was the first thing I inspected, and I was quite impressed. It includes color pictures and very detailed information and history of the F-22 itself (15 pages), and continues with similar material on the Su-35, EF2000, MiG 21 and many others. Combat strengths and weaknesses as well as other useful tactical information is provided. It's an excellent virtual fighter-jock school.

The operation manual for the F-22 simulator itself is 176 pages, printed in black and white, but with good quality printing and illustrations. All aspects of operating the simulator are explained in detail. Although there is a certain amount of repetition in the instructions, this is not necessarily a bad thing, particularly for first-time users. Other flight simulation software vendors could use this manual as a guide on how to document their programs. On-line help menus are nice, and the help



files in **F-22 ADF** are quite extensive, but there is no substitute for well-written documentation.

View out the cockpit

As a scenery designer for FS98, the first thing I always look at in any new simulator is the scenery. The quality of the ground terrain, detail, 3-D objects and rendering of textures from the graphics engine are the heart of any modern flight simulator. Combat simulators typically fall short in this respect, which is why I was pleasantly surprised, perhaps even shocked, when I observed the graphics performance on my first flight. Texture rendering was smooth, natural and not pixilated. And the terrain relief is absolutely extraordinary! It is based on spot imagery of the actual real-world terrain. All of the elevation points in the terrain looked like natural formations, instead of textured cones. It is exceptionally realistic.

3-D Acceleration capability

F-22 ADF currently supports the ATI Rage Pro AGP card, cards using the 3Dfx Voodoo chipset (Diamond Monster, Orchid Righteous, Maxi Gamer, Realvision Flash, Micro Hiscore, Canopus Pure 3D, Skywell magic 3D, etc.), and video cards using the 3Dfx Voodoo Rush chipset (Hercules Stingray 128/3D, Intergraph Intense 3D Voodoo, Deltron Flash AT3D, Jazz Adrenalin Rush, etc.).

F-22 ADF also supports the Nvidia Riva 128 chipset AGP cards, e.g., Diamond Viper330 and STB Total 3d AGP, and any 4Mb PCI cards with 8-bit palettised textures. The supported cards should have vertex fogging, 16-bit screen mode, and 4 MB of video memory. Perspective correct texture support and alpha texture support are recommended. I ran this program using an ATI Rage II Pro system with 2 MB of memory, which worked just fine.

Feature Review

3-D objects are not textured, but are convincing and easily recognizable, particularly the aircraft models. (Easter Egg: an Aurora is hidden in the mix—can you find it?) The dynamic modeling of the aircraft and ground vehicles is quite good, but even more realistic is the way they come apart when they explode. If you fly too close you will sustain aircraft damage, so watch it!

The scenery engine makes very good use of the 3-D-hardware acceleration, without the distortion and bitmap mapping problems seen in many contemporary flight simulation programs. The accuracy of the terrain detail is particularly pronounced in 800 x 600 resolution, high-detail mode, which you can specify in the Options screen from the startup menu. Even the desert terrain has an impressive variety in the rendering of the landscapes, so you will not be bored by the view, even in the middle of a stinkin' desert!

The sky has a very natural blue tone, and the cloud formations, multi-texturing and layering are quite realistic. Haze, smoke and fog effects are varied and not displayed in a monotonous fashion. Night lighting effects, dawn/dusk horizons and other color-intensive display characteristics, like explosions, are accomplished without gaudy splashing of the color palette in your face. F22 features very realistic effects, particularly for a combat simulator.

Since the display requires that your desktop be set for 16-bit colors (high color), you may have to change these parameters on your Windows 95 desktop (right-click on the desktop, select **Properties**, then **Settings**). This is worthwhile, since this is part of the secret in displaying the natural color tones mentioned above.

All in all, I must tip my hat to the scenery engine developers and the scenery artists. They have done a very good job.

Sounds

Even using the plain-Jane, built-onto-the-motherboard sound system on my IBM P233 MMX, I found the sounds quite convincing, and even more importantly, consistent. I heard no stuttering, distortion or pitch-squeal. The smorgasbord of sounds offered is very extensive, from the cockpit/aircraft surface/engine sounds to the exterior sounds. Aircraft damage results in a convincing series of ominous airframe noises, making one tempted to punch out. The sounds are also very well done.

Flight model

I tested the dynamics of the aircraft under the most extreme conditions I could concoct, and under established norms, such as rotation speed, stall speed and VS climb. I performed some stalls, flat spins and a saw-tooth climb. As some know, modern high-performance aircraft do not use a set of ailerons for roll and a set of elevators for pitch. These controls are combined into one flight surface called an "elevon." The F22's elevons, incorporated with the vertical stabilizers, performed as I expected for yaw and roll characteristics. This allows you to perform the kind of tight maneuvers and high-G turns that you will need for aerial combat. The elevon's elevator control was a different matter. It was quite sluggish and made some maneuvers somewhat difficult.

The standard joystick connection via the Windows 95 interface worked just fine with both my Wingman Extreme and my CH Virtual Pilot Pro yoke, which I typically use only for general aviation simulation. Sensitivity is about as realistic as possible I think, for the yaw and roll characteristics. The actual F-22 incorporates a fly-by-wire system, which requires almost no stick movement to perform even radical maneuvers. I really don't think this

would be easy to duplicate on a PC/joystick combination. But the null-zone for the elevator control definitely needs improvement. It is just too wide.

Simulator features

F-22 ADF features the most extensive modes of operation I have yet seen in a combat simulator. This is more than just a "point and shoot" arcade-style game. No, this offers much more. This is as close as you can get to a full-blown real-world military simulator, given the present state-of-the-art in PC hardware. In addition to just flying about wreaking mayhem and destruction, with **F-22 ADF** you have an impressive variety of tools and modes of operation at your command:

AWACS Command

In a real-world theater of operation, an F22 driver will have the benefit of the E3 Sentry AWACS (Airborne Warning and Control System Command) aircraft, which will direct all operations within its RADAR view and identify and prioritize strike targets or incoming air threats. A fully functional AWACS aircraft is provided for many of the missions and tours of duty incorporated in the simulator. In these instances, you are provided with a versatile AWACS Command Interface, which will allow you to "change hats" and coordinate the mission parameters as the AWACS commander. All of the control and display parameters are outlined in detail in the manual.

ACMI Instrumentation

A very cost-effective training tool, in terms of both equipment and lives, is the ACMI (Air Combat Maneuvers Instrumentation) system, used by the Air Force to assess a pilot's skill level and compliance with mission parameters. The data from the aircraft is

recorded via an under-wing data pod for 3-D reconstruction of combat and aircraft maneuvers during post-flight debriefing. **F-22 ADF** incorporates both the flight data recorder and an ACMI Mode display for review after a mission. You can assess for yourself how well you achieved your objectives, and save the ACMI recording on disk for future reference, or as your evidence, in case your friends ask for the gun camera film!

Airborne refueling

To my knowledge, no other combat simulator has incorporated this feature. **F-22 ADF** allows for realistic in-flight refueling. This is not simply an option on the menu, which says, "Refuel." This is an actual in-flight recreation of the refueling process with an airborne tanker. You have to vector to the tanker, communicate with it, maneuver in position, and make contact with the refueling boom. This is a very realistic experience, complete with the receiver director and contact lights on the refueling boom. This is another very slick feature.

Smart views

These are incorporated so that you can appreciate the scenery detail and the total flight environment, and not just stare at the instrument panel and cockpit canopy in an attempt to hypnotize yourself. The Smart Views are a special set of camera views which will allow you to see the entire environment. You can select what type of action or objects you want to see, their allegiance, and toggle between objects.

Simulator training missions

This option allows you to fly pre-defined set of about 40 training missions, so that you can build up your skill level before actually going to war. Each mission has its own briefing, map and debriefing which will summarize your performance and compliance with the mission parameters. You can also maintain these records in a personal log. The training missions will allow you to become proficient in take off/landing, in-flight refueling, emergency procedures (engine/hydraulics/electrical failure), flight maneuvers, weapons deployment, familiarization with your wingman, and AWACS training. You can access the training missions at any time, in whatever order you choose. The missions are designed as a training tool to prepare you for the Tours of Duty.

Tours of duty

All diplomacy has failed, and it is time to go to war. **F-22 ADF**'s Tours of Duty consist of several sets of three scenarios, which increase in difficulty as you progress. The multi-player function is not available for the Tours of Duty. This is the real thing, so make sure you are proficient in all aspects of both flight and combat/weapons deployment before you tackle the Tours of Duty. A brand new companion CD, *Red Sea Operations*, is coming to your local retail software vendor. It is a Tours of Duty expansion pack with sets of new conflicts set in the Red Sea Theater. It should be released by the time this magazine gets in your hands. You can get further information at <http://www.did.com>.

Quick combat

Want to jump right in and start shooting? You can choose the Quick Combat option in your startup screen. It is an arcade-style interface, which will allow you to select from a set of pre-defined missions, each lasting five hours. You must follow a waypoint route and destroy targets as you find them. A system of points is tallied so that you can measure your skill level. Each mission incorporates quite a few tough challenges.

Conclusion

F-22 ADF exemplifies the state-of-the-art in combat simulators at this time. The quality of the 3-D scenery engine/graphics, the flight models and sounds, along with the versatile features of the program will provide purchasers of this package hours worth of challenging entertainment. The superb documentation and functionality of the menus and flight controls make **F-22 ADF** both easy to operate and fun to use. **F-22 ADF** is a must have for combat simulator enthusiasts. Contact your local software vendor for more details.

F-22 Air Dominance Fighter

Developer

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www.did.com

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Reviews

WinPlanner Plus
The Jet Age
Scenery San Diego
Scenery Canada
RealATC
AETI Advanced Flight Control System

WinPlanner Plus

Review by Adam Howe

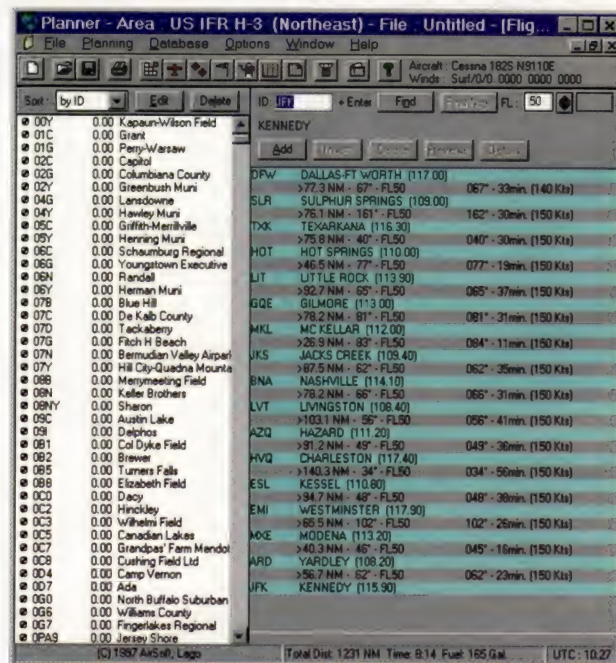
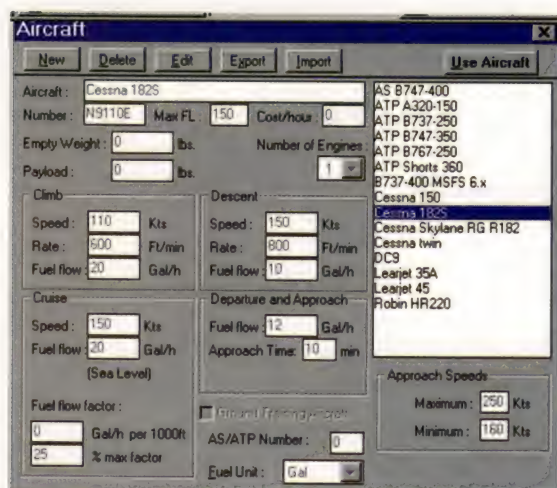
Have you ever been lost in the virtual world of flight simulation? Ever keep thinking to yourself, "The airport has got to be here somewhere?" Well, nevermore! Now you can navigate the world of simulated flight with LAGO's **WinPlanner Plus**. **WinPlanner Plus** is a comprehensive flight planner with an easy to use Adventure generator.

This program also allows you to randomly or manually control the weather enroute.

Commonly, flight simulation add-ons are only compatible with one particular program. **WinPlanner Plus** has broke through the compatibility barrier and has made the program compatible with subLOGIC *Flight Assignment ATP* (Revision D—USA East, Revision D—USA West and Revision E), Microsoft *Flight Simulator* (5.1, 6.0(FS95) and 6.1 (FS98)) and the LAGO *Airline Simulator*.

Installation is as easy as inserting a CD-ROM and following the instructions on screen. If your CD-ROM's auto-run is disengaged, just run Setup.exe from the CD and you are on your way. For most users the installation will be a snap. For

others, it may get confusing without help that would normally be found in the manual. Once installation is complete, **WinPlanner Plus** automatically opens an Addendum to the manual that can come in handy. I found the program to be a bit confusing and



cumbersome at first, but as all programs go—remember learning Windows?—it gets easier with time. Since **WinPlanner Plus** is not as big or involved as Windows, any user will find it easy to discover the rest of the “sim” world in no time.

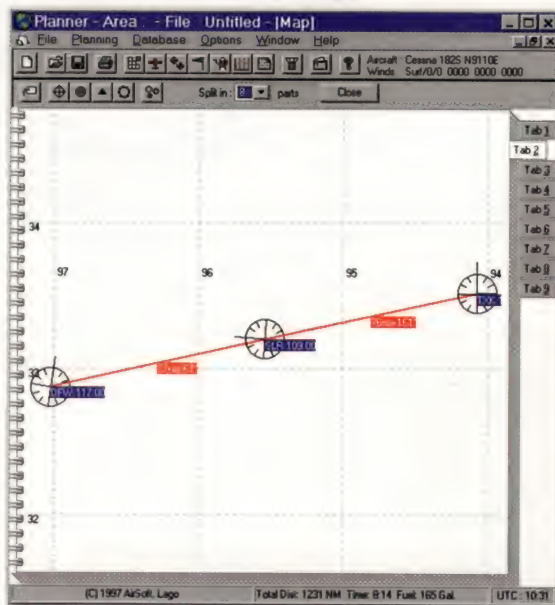
The tri-lingual manual (English, German and Italian) is easy to understand. I found the examples in the book easy to follow, but I got lost when attempting them on my own at first. The 88-pages-per-language manual is adequate, but the type is small and difficult to read, not to mention the screen shots used in the examples.

WinPlanner Plus’s essential information is stored in databases, which contain all the aeronautical data from each simulator’s default sceneries. Once the database is opened, setting up a flight plan is quite simple and can be accomplished two different ways. Entering the ID for the departure and arrival airports will generate a flight plan in just a few seconds. If you are like me, you probably only know ten airport IDs in the world and the first method would not be sufficient. For those like myself, you can customize your flight plan by selecting waypoints from the opened database. The fact that

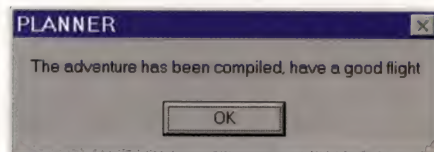
WinPlanner Plus can only display the first 2,000 waypoints in a database really doesn’t matter. You can still enter the ID manually to access the waypoint information that is not displayed. **WinPlanner Plus** can also calculate the best altitude for your plane to optimize fuel efficiency. Simply select the aircraft you will be using from a pull-down menu, or enter the specifications of a third-party aircraft.

With your flight plan completed, you are ready to print with a click of a button. Another click brings up a full-color map of your flight plan, including

the waypoints of the flight plan, with the IDs and frequencies you’ll need along the way. If the display is crowded on the screen, you can use a convenient pull-down menu to break the flight plan into sections, depending on how long the flight is. One more click and the color map is on its way to the printer. If you have separated the map into sections, each section must be selected by a tab on the right of the screen and printed individually, but it is much easier to read. Some printer drivers will have trouble printing the maps. The manual recognizes this and gives suggestions for getting your map onto paper.



As you know, an FS Adventure can add a lot of realism to even a simple flight. Creating an Adventure with **WinPlanner Plus** is as easy as clicking a button. Once a flight plan is entered, set the weather conditions and simply click a button on the toolbar or choose **File | Generate ATC Adventures** from the menu bar. Accessing the Adventure couldn’t be easier: open *Flight Simulator* and select your new Adventure from the list under **Flights | Adventures...**



What flight plan would be complete without intersections, or SIDs (Standard Instrument Departures) and STARs (Standard Terminal Arrival Routes)? Entering a SID or STAR into a flight plan is simple and well explained in the manual.

All in all, I found **WinPlanner Plus** to be a great program for serious flight “simmers” and pilots. A beginner or someone new to flying may have a difficult time with the complexity and detail of the program, but what better way to learn than to jump right in. **WinPlanner Plus** is really a great program that novices and experts can use, understand and learn from (not mention become a better cyber-pilot).

WinPlanner Plus

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Internet: www.lagoononline.com

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100411.3660@compuserve.com

Minimum System Requirements:

80486DX/33 or higher

microprocessor

4Mb of RAM

6Mb of free hard-disk space

CD-ROM drive

MS-DOS 5.0 or later and

Windows 3.1, 95 or NT 4.0

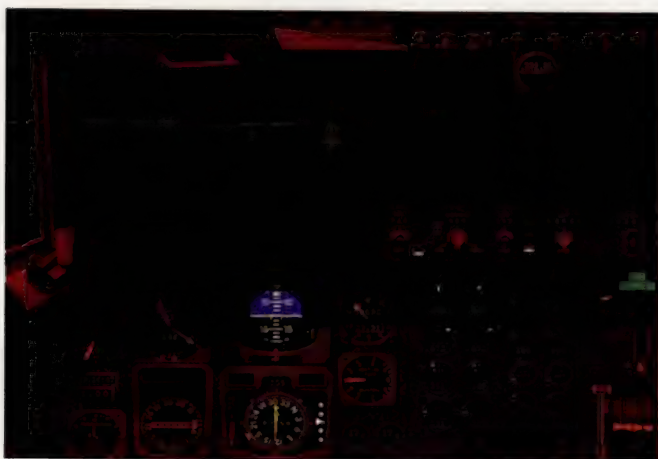
Recommended:

Any Windows-compatible printer
Mouse

The Jet Age

Review by Peter James

It was a dark night at FL330. The 2.2-hours trip from Jackson Hole was running on time. Departing JAC at sunset was spectacular in the mountains, and the always-outstanding visibility was a spectacle for all on board. Actually, I was the only one on board, but telling the truth would ruin a flight simmer's imagination! Anyway, the reports coming in from DFW were not going to be good for sightseeing. I have never been to DFW in FS, so this will be a "flightsim first" for me. The approach was routine, as I set the shiny Delta 737-300 up for the ILS to 31R.



For some reason or another, ATC was using this ILS even though winds were south at 10 to 20 kts. The whine of the new engine sound filled the cabin as more thrust was added as flaps and gear plowed the air. The autopilot on this "new for me" 737 was doing a fine job holding the approach, even with the quartering tailwind. I figured I'd give FS's autoland function a try. This is the

ultimate test for any new flight model that I am evaluating. In conjunction with GPWS version 7.2 (the one with cabin calls included), our Delta 733 continued a rock-steady approach. I kept my eyes out the right side view for the entire landing! I put complete faith in the quality of the flight model and the autoland capability. It paid off.

Down to 1000 feet we started breaking in and out of the low clouds and murk surrounding the DFW area. Glimpses of the city buildings were visible as lit office windows twinkled in the dark foggy night. Lights of houses and streets rushed by, as my viewpoint was very realistic. The side view put me slightly behind the wing for a great view of wing tip lights, trailing edge and the big Fowlers dragging in the wind! It was just like being in the passenger seat for landing. At 200 feet my roundout altitude was displayed, which would be around 60 feet. My speed was held at 140 kts. From the side I saw the airport boundary taxiways zoom past. Sure enough she rounded out, and the descent rate was

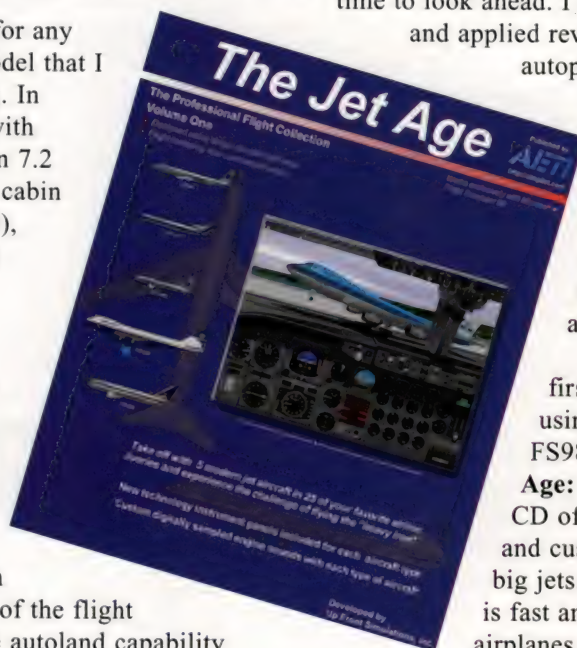
constant at 300 fpm. At 30 feet I cut the power to idle and she slowly thumped onto the pavement. Wow—hands off and all from the side view. Now it's time to look ahead. I lowered the nose and applied reverse thrust as the autopilot continued to

track the runway centerline. It was a fantastic landing in a wonderfully stable and accurate 737-300.

That was my first "serious" flight using AETI's new FS98 add-on, **The Jet Age**: a nicely packaged CD of airliners, panels and custom sounds for big jets. The installation is fast and easy. All airplanes, sounds and panels are correctly placed.

All you have to do is run FS98 and fly! With the endless supply of freeware airliners, panels and sounds available you wouldn't think there'd be a reason to purchase a commercial add-on. Well, here are the main reasons I found **The Jet Age** worthy of commercial sale. Everything installs for you. You don't have to mess with panels, sounds and file placement. You can't get find this type of setup off the 'net. The second reason is quality. In order to sell your product, it must be better than everyone else's. Being a connoisseur of jetliners, I knew I'd be a tough judge.

After installation you will find a set of 737-300s, 747-200s, 767-200s, 727-200s and classic 707s. Each plane has its own panel and sound files. That's right, it's all there! Supposedly all sounds came from the real airplanes themselves. I will now get down to the facts, as my hours of test flying are done.



The visual aspects of the 737-300 are outstanding. These are by far the best jets in the group. I will go ahead and say, "Yes, these are my favorite 737s I've ever seen for FS." All parts are accurate to scale.

There are no spoiler graphics; I assume they ran out of parts—so this is no big disappointment.

The designers at AETI decided to try something new in the cockpit. They placed the inside viewpoints for left and

The external and internal engine sounds are excellent. All other sounds are default airliner FS98 sounds, such as flaps and gear. As in most FS98 airliners, you will have to edit the Wind portion of your sound.cfg to activate the wind noise. Overall, I'd rate the AETI 737-300 a 91 out of 100 possible points.

The visual aspects of the 737-300 are outstanding. These are by far the best jets in the group.

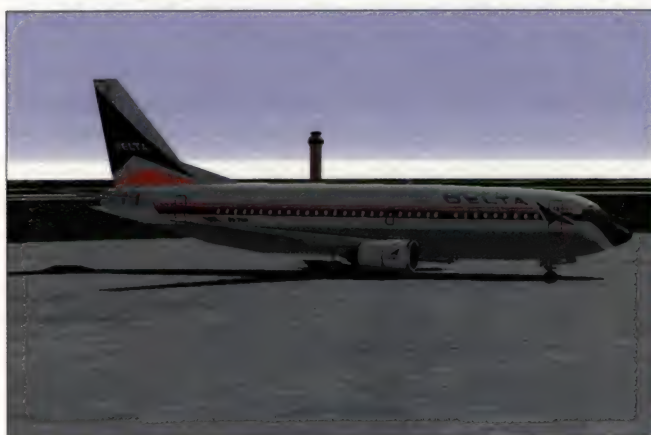
Boeing 727-200

On to the Boeing 727-200: You can see the bare metal shiny textures applied to this most-loved airliner. The night lighting is great. Once again the details are nicely done, but with some flaws the 737 didn't have. The most noticeable was the inaccurate scale of the rear-mounted engines. They are only about half as long as the real engines on a real 727. I don't know how such a detail could have been overlooked, but it was. This bothered me. Secondly the passenger windows were larger than they should be. From the inside, cockpit views are traditionally positioned.

The flight quality again shows professionalism. I took a flight from DFW to Nashville, Tennessee. It was a 1.3-hour trip at FL320. The lack of vertical speed hold and autothrottle made the climb and cruise portion a bit rough as there was turbulence at altitude and manual input was needed. Airspeed varied from M.75 to M.80 in the chop. This was a weather problem, and not the 727's. I wish there were autothrottles and VVI hold installed on the panel. I have a hard time believing even an old 727 wouldn't have been upgraded to have these functions. On approach to Nashville, the weather was good VFR and winds were light. This made for a good hand-flown visual approach. As in past 727s I have flown on FS, this one proved equally stable and easy to fly. From real pilots I have spoken to, this is true of the 727. My approach was rock-steady at only 127 kts. Landing was bouncy due to my own

right behind the wing in the passenger compartment. Now, I confess when I first saw this I was shocked and thought flying this way would be foolish. Well, after my exciting landing I described above, you see I am very much in favor of this viewpoint. Besides, if you want to stay in the cockpit, you can just pan your view left and right. Most of us have a control unit with a "hat" switch to make this easy. Though I originally thought it was a mistake, I praise the designer of this 737-300.

The designers at AETI decided to try something new in the cockpit. They placed the inside viewpoints for left and right behind the wing in the passenger compartment.



This is the first thing I look for. The paint job is excellent, with the nose area showing a shiny coat of paint. When flaps are down, you'll see them as well as the leading edge slats. When the landing gear is down, you'll see the best tires and wheel hubs ever reproduced on an airliner. In addition, there are gear doors and appropriate landing light graphics. At night, you're treated to a nicely lit cabin, something most aircraft designers forget to include.





You can see the bare metal shiny textures applied to the 727. Once again the details are nicely done, but with some flaws the 737 didn't have.



The panel of the 727 is nice, but doesn't compare to the quality of some freeware photorealistic 727 panels I have used.

sloppiness with the power. I cut it too early, realized my error, added too much power, and floated, then bounced in. I was slow, as my airspeed at touchdown was 100 kts. Stopping was fast to say the least.

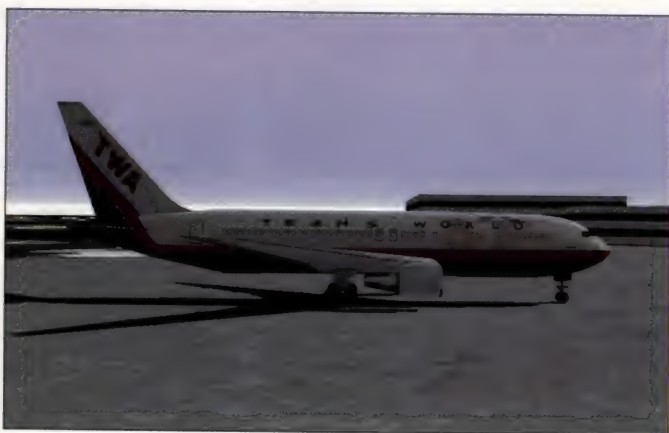
The panel is nice, but doesn't compare to the quality of some freeware photorealistic 727 panels I have used.

The engine sounds were great from the outside, but the inside sound was squealy and sounded too much like a train on rails. I've been in real 727s in flight, and they don't sound like this. Overall, I'd rate the 727 a 76/100. Those of you who care most about the flight model may say I have a flap loose, and give this one a higher score.

Boeing 767-200

Next is the Boeing 767-200. The visual model isn't bad, but not as good as some I have seen on the net. It has nicely done shiny engine parts. The paint job, window pattern, night lighting and wheels are all done well.

There are no spoilers on the wing. One problem I have with the 767 is the fact that the landing gear is much too



The 767 visual model isn't bad, but not as good as some I have seen on the net. The paint job, window pattern, night lighting and wheels are all done well.



Of all the panels that come with The Jet Age, the 767's is the best. It has a better overall look and feel and is more of a true looking 767 panel.



high. The real plane is rather "squat" to the ground, and this one looks like it's ready to taxi through a river.

I flew on a trip from Nashville to Atlanta. Taxi, takeoff, climb and cruise were perfectly accurate. The 767 is a powerful jet, and at light weight a VR of 130 will do quite well, as I experienced. Climb rates were swift, on the order of 3000 - 4000 fpm at 250 kts. Once higher, I trimmed for a 320 kts climb and eventual cruise at M.80. My landing in Atlanta was a real greaser. Again, the 767 in real life must be as stable and easy as the ones I've flown on FS. This one is no exception. Both external and internal engine sounds were good.

Of all the panels that come with **The Jet Age**, the 767's is the best. It has a better overall look and feel and is more of a true looking 767 panel.

While not up to the standards of the interaction and details on some of the freeware panels of today, you must realize this panel was developed before the MS SDK became readily available to the panel makers. Overall, I'd say the 767 earns 84/100 points.

Now that I was in ATL, I could feel comfortable flying the Grand Daddy of all airliners. I decided to pilot the second and third leg of an imaginary "Speedbird" flight from London. My flight was to go from ATL - DFW - San Antonio.

Boeing 747

The visual model of the Boeing 747 sitting in the early morning hazy sun was not bad. I can't say it was great, but the 3-D tires and shiny engine pods made up for a few errors. The problems I found included bleed-through in the landing gear, gear doors and engine pod areas. This seems to be a common problem among all 747 designers, so I can't say it's something unique to these aircraft. However, as in the 767, the landing gear was much too tall. I was upset to find no leading edge slats

The visual model of the Boeing 747 sitting in the early morning hazy sun was not bad. I can't say it was great, but the 3-D tires and shiny engine pods made up for a few errors.

The 747 panel was the same quality and functionality as the 737.



visible when the flaps were down. Everyone does that these days, so I'll knock several points off for that.

Back inside, I can report the 747 handles like a charm. Sharp turning abilities were present. I knew then that the flight would progress well. After slowly taxiing to 9L, I was given immediate departure clearance. VR was around 144 kts, and climbout was brisk. The hand-flying portion of the climb was responsive and nicely coordinated. Once level at FL350, I cruised at M.85. All was well. After a little while, I hit some light to moderate chop courtesy of **Real Weather 5.0**. I was rocking side to side a bit, but she rode through the turbulence just as good as any airliner I've flown. From this point on, the descent and arrival at DFW was just perfect. My next short leg to San Antonio was equally rewarding. The flight quality was perfect.

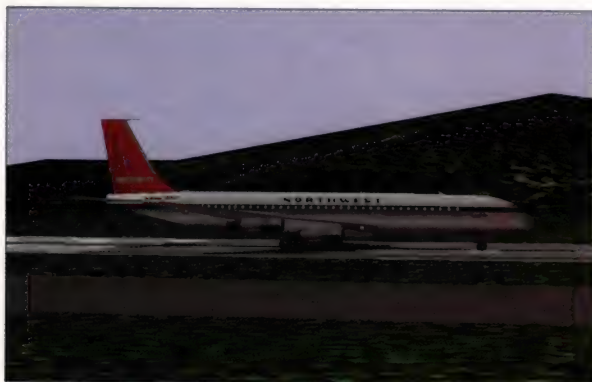
The panel was the same quality and functionality as the 737.

The interior sounds were okay, but I decided to use my favorite 747 sound I made myself. **The Jet Age**'s exterior sound was great.

Again, the flight model wins hands down; the visual model falls in the fairly accurate but plain category. Again, I've seen many more accurate and detailed 747 exteriors on the net. Overall, I'd give the 747-200 collection an 83/100.

Boeing 707

I've not spent much time flying any 707s in FS, so this would be an exciting and new experience for me. Looking at these classic jetliners was great. The visuals were excellent, I am glad to say, and were in bare metal textures. The planes even looked slightly grubby. Once more, the tires and wheel hubs were fantastic. I've never been so excited about wheels before.



I next took a special chartered flight on the old Northwest 707. I flew from Santa Fe, New Mexico, to Grand Canyon State Airport, in Arizona. I was already at a high altitude airport, and I figured the 707s were a bit of a pig on departure, so I planned for a flaps 20 takeoff. Boy, was I in for a surprise! At an estimated VR of 149 kts, I pulled back and nothing happened! I waited for 160 kts and just barely the nose came up off the ground. At 170 kts my rear bogies just lifted off the pavement and cleared the runway approach lights by five feet! I blasted over the countryside, gaining altitude slowly. Finally, I was up and climbing at 250 kts/2000 fpm. I planned for FL310. While sluggish in climb, the 707 was rock steady. I believe this is real. My landing at the Grand Canyon was scenic. My overhead approach and full pattern required a lot of room as the 707 proved to be a sluggish turner. Be

aware, at fairly steep banks, it generates a heavy sink rate as well! Landing was fast and sink rate was high. I bounced about 20 feet off the struts, maybe 10 feet off the ground for a two-bounce, side-loaded landing at 149 kts! It was quite a fun ride! With reversers screaming, I was able to stop the beast at the runway end!

My ears were "bleeding" at the end of the trip, as the sounds supplied are the same ear-wrenching squeals as the 727 engines had. This was not realistic as a cabin sound. I replaced the more muffled external sound with the internal sound and found that to be a better fit. Maybe they were switched by accident?

The panel on the 707 was blurry, very crude and the least functional of the bunch. It was really not a panel I would use, except to do this review. While the 727 and 747 panels were okay, this one was not. Many features

Looking at these classic jetliners such as the 707 was great. The visuals were excellent, I am glad to say, and were in bare metal textures. The planes even looked slightly grubby.

of the panel were somewhat blurry, and the level of detail was not quite what the other panels were.

The 707 becomes a real charm when you replace the panel and sounds. Anyone familiar with flightsimming will know how to do this. However, I feel more effort could have definitely been put forth for that panel. Overall, I rate the 707 an 80/100. A good flight and visual model make up for the poor panel and sounds.

The Jet Age is a good package if you don't want to spend your precious free time hunting for quality flight models and configuring loose files into your FS98 directory. If you aren't too picky about sounds and panels, and want an organized, easy installation, then purchasing **The Jet Age** is a worthy investment. I can't say you'd find better flight models from freeware on the net. There is no doubt these are of commercial quality.

In all fairness to AETI, I must put in for another plug for their 737-300s! These are the very best 737s I have ever flown. In reviewing this product, I have found myself very fond of this little Boeing.

The Jet Age

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Scenery San Diego

Photorealistic Scenery of San Diego

Review by Tim Dickens

Several "photorealistic" sceneries for southern California have been produced over the past few years, but none have achieved the level of accuracy and attention to terrain detail of Safari's **Scenery San Diego**. Safari has produced a first class add-on for users of Microsoft Flight Simulator. The scenery area extends from Camp Pendleton MCAS, just north of San Diego, to Tijuana, Mexico, then west to Mexicali, Mexico. The entire San Diego and Imperial Valley area are faithfully represented here, especially the ground terrain textures. The density of coverage and attention to detail within this geographic area is quite extensive, using 70 MB of custom textures to give the local terrain a realistic look rarely achieved in Flight Simulator scenery.

Installation

Scenery San Diego's easy-to-use install program successfully places all the files in the correct location for immediate use. There is no need to manually enter the new scenery into the FS Scenery Library. The install program does this for you, automatically installing the scenery as Priority Layer 1 in the scenery library. If you would like it to reside at a lower level, you can manually edit the library and place it wherever you like. Be careful to keep it above the Performance Booster files and any other scenery within that region, or it may conflict with other scenery. If you use

the MS Southern California Expansion pack, it is recommended that you disable it in the FS Scenery Library when flying the San Diego scenery.

After installation, you may access the scenery immediately from the FS airport menu. In FS98 the files will be located in the "FS6 and Before" section of the **World | Go To | Airport** menu.

Technical support and documentation

The ten-page manual provided with the program outlines the installation procedure and provides suggestions for flights across the region. You'll also find data on each airport with navigation aids and a map of the region illustrating the position of the nav aids and the airports. An on-line help manual is also provided on the CD-ROM.

The scenery

27 Airports are provided in the package, including those which are normally included in the default FS98 scenery, such as Lindbergh Field in San Diego, which this scenery "replaces." City detail near the airports is realistically recreated using custom textures, which blend into the other custom textures of the localized terrain in a very natural way, so that you do not see blocky polygon shapes as representations of cities.

The really outstanding features of this scenery are the mountains and localized elevation of the area. The custom textures present an extremely effective rendition of the actual Southern California area. The

sculptured features of the mountain relief, as well as the matching textures of the surrounding terrain, blend naturally and do not exhibit the sharp peaks and drastic color tone contrasts present in much of the default FS scenery.

The Pacific coastlines display the same attention to detail and realism. The transitions from water to beach to land are very realistic, and the textures utilize a custom color palette that presents a very believable Southern California coastline. Locals and people, such as myself, who have frequented the area many times will appreciate the accuracy of the geographical features.

Rivers, roads and other geographical landmarks are rendered in the same fashion, making the terrain both visually appealing and very helpful for VFR navigation. You can follow Interstate 805 all the way from San Diego to Tijuana, Mexico. Or use Interstate 8 as your pathway to the border town of Mexicali. Many other landmarks are provided to aid in VFR navigation, such as the San Vicente Reservoir and the Mt. Palomar Observatory.

Airports are represented as part of the terrain relief, and not just placed on flat textured tiles with the 3-D relief built up around it. They are actually built on top of the 3-D terrain. This avoids having flat airports surrounded by huge lumps of elevated terrain, making the airports appear as though they actually belong there. Camp Pendleton MCAS is a good example of this effect. This gives a natural appearance to the 3-D terrain from the ground perspective, when sitting on the runway, *i.e.*

3-D objects

Since custom 3-D objects, like building, hangers, etc., are my bag, I can never review a scenery add-on without paying some attention to how 3-D objects are employed. As a general

overview, 3-D objects are used more extensively than in the default FS98 scenery. In fact, there are some very nice custom buildings in downtown San Diego, which very much add to the realism. I can tell you from experience that these types of buildings require quite a bit of work if you want to make a faithful representation. So as far as this goes, I must say, "Job well done."

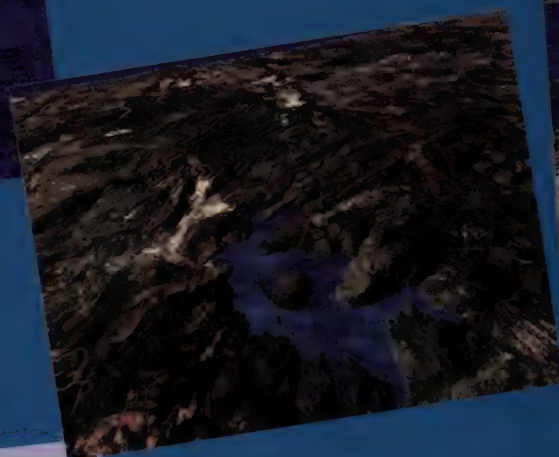
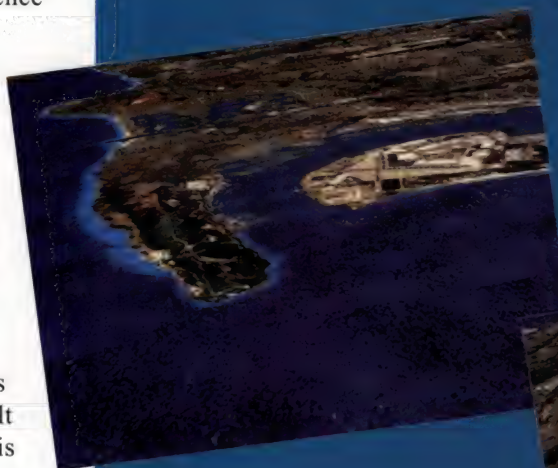
However, this scenery falls a bit short when it comes to airport detailing. There is very extensive use of the standard FS airport structures, such as the terminal building at Lindbergh Field. This is pretty much the way that the default FS scenery appears. Although this is not necessarily bad, given the obvious talent of the designers and the attention to detail exhibited in all other aspects of the scenery, I expected a bit more here. Some airports, such as Salton Sea, for example, really have almost nothing in terms of 3-D objects that make them "look" like airports.

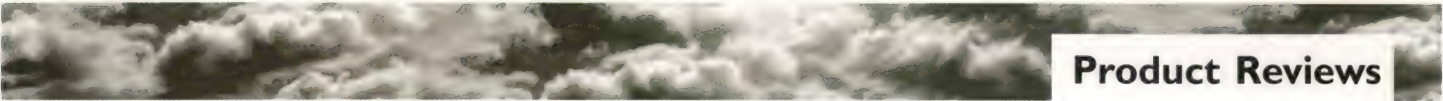
This is not a major objection, but something that I think could be improved.

Performance

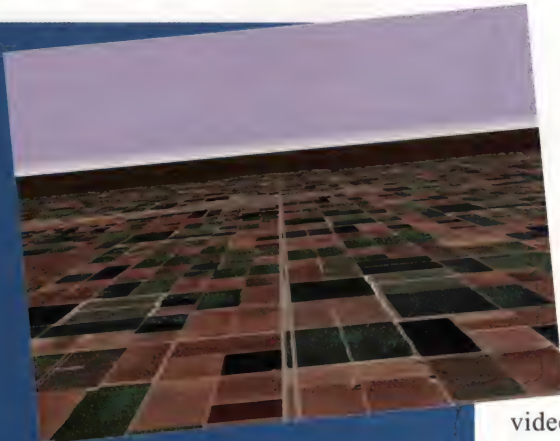
I tested this scenery on a 233 MMX (K6) system with an ATI Rage II 3-D video system. Although the 3-D-terrain relief does impact frame rates somewhat, the level of detail seems relatively well balanced to take system performance into account. My frame rates varied from a high of about 15 fps, to about eight fps in the most dense scenery areas. This compares favorably to the way my system performs in the default MS scenery and other third-party scenery add-ons. Users without quite as much muscle in their system may want to fly the scenery at a lower complexity level (sparse or normal) to avoid a slowdown in system performance.

Scenery examples from Scenery San Diego



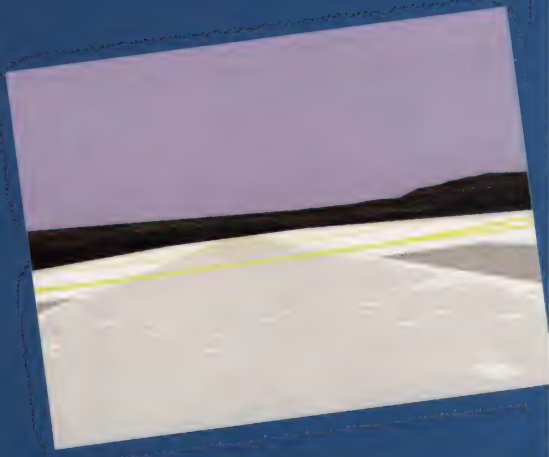


Product Reviews



Because of the extensive use of textures in the scenery, sometimes the textures will be slow to load onto your system, depending primarily how large a texture buffer your video card uses. This will typically happen with distant terrain, toward the horizon, and usually does not affect your immediate field of view. As 3-D video technology progresses and more advanced video cards and drivers make their way into the market, this phenomenon will most likely become a thing of the past. This scenery is in no way unique in this problem. It is seen in most texture-dense third-party scenery.

Conclusion



All things considered, I think this is an excellent add-on scenery package for MS Flight Simulator. It provides a much more faithful representation of the San Diego area than either the default FS scenery or the MS *Southern California Expansion Pack*. Its superiority is obvious, particularly in the custom texturing of the terrain relief, the number of elevation points and the accuracy of the local landmarks and ground details. Anyone who flies the virtual skies in this area, or anyone who is interested in doing so, should give this software package serious consideration.

Scenery San Diego

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Scenery Canada

Review by Adam Howe

Being a Flight Simulator expert, such as yourself, I am sure you are familiar with the need for more scenery, especially for FS5.1 and FS6. Wizard Works has come to the rescue for Canadian users and everyone who is interested in flying in or through Canada. Even though this scenery is not the most detailed available, it is very complete. It contains scenery covering Canada, from the grass and dirt strips to the major metropolitan airports.

Scenery Canada will add 29 listings to the **World | Go To Airports** menu in FS5.1 and FS6.

The scenery is separated into sections according to Province. Even though this clutters the Airport menu, the ability to fly across the vast country of Canada is quite a nice feature.

For added convenience, the scenery installs 13 situations to get you under way quickly. The situations are set up primarily as ILS approaches to major airports, including Calgary, Alberta, Montreal, Niagara Falls, Toronto and other exciting approaches.

Installation of this software package is quick and easy. Simply run SETUP.EXE from the CD-ROM and

The ILS approach to Pearson Airport in Toronto is one of 13 situations installed with Scenery Canada.

you are on your way. Once installation is complete, you will have to use the **Scenery Library** in the **World** menu in FS to add the scenery. The included manual not only outlines the installation, it also describes how to change your start up situation. For the advanced user of FS, this will seem trivial, but it really comes in handy for those less experienced.

Included on the CD-ROM are also eight text files containing information on the following:

- ➔ General information about the Scenery Canada, including manual installation instructions.
- ➔ List of airports with Latitude, Longitude and runway information.
- ➔ ATIS information including frequency, latitude and longitude.
- ➔ ILS information including airport name, ID, frequency, latitude and longitude.



- ➔ NDB information including name, ID, frequency, latitude and longitude.
- ➔ A short history of Canada.
- ➔ General information on the bonus Maine scenery.

If you look at a map (or remember your geography lessons), Canada borders Maine on three sides. The Maine Scenery is provided as a bonus to keep the flights continuous.

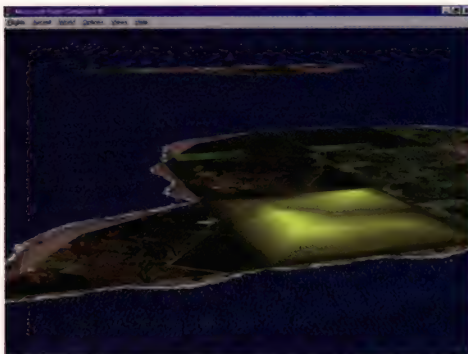
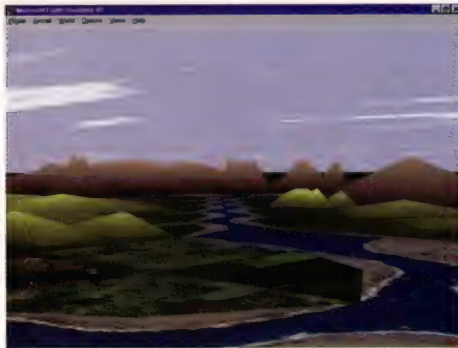
Just for the fun of it, I placed the **Scenery Canada** into FS98 to see if it would work. It seems that Microsoft has changed the FS elevations thus not allowing an older scenery like this to work in FS98 (certainly not on purpose). I noticed mountain conflicts as well as elevation problems. If you are going to add **Scenery Canada** to your Flight Simulator add-on collection, be sure you use it with FS5.1 or FS6.

What makes a good software package? This has plagued reviewers for a long time. Everyone has a different opinion and everyone looks for different things. When I look at scenery, I look for the little things: buildings, towers, hangers, the occasional house of the designer, extras like that. This scenery is lacking the



An Abacus CoPilot rendition of the airports included in Scenery Canada. Each blue dot represents an airport

little details that make a scenery special. The value of this scenery comes not in its detail, but rather its thoroughness, especially concerning the airports. With over 750 runway entries, it is easy to see why **Scenery Canada** is a must have for any Flight Simmer looking to sail the great Canadian skies.



Scenery Canada

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RealATC

Review by Scott M. Slaughter

No More Flying Alone

One of the realistic elements that many simmers have found missing from *Flight Simulator* is chatter from the air traffic controllers. True, you can "hear" the chatter by reading the scrolling text across the top of the screen. However, many *Flight Simulator* enthusiasts—including me—need to concentrate on flying and not take time to read text scrolling across the screen. Although we can always press the **P** key to pause *Flight Simulator* and read the flight instructions, this is also an inconvenience and takes away from the realism we want to enjoy.

Fortunately, thanks to **RealATC** from Papa Tango, you no longer need to read scrolling text while flying. **RealATC** includes over 300 WAV files from existing ATC locations, so you can hear the actual air traffic sounds occurring in the skies and on the ground around you.



Using *Flight Simulator* this way was new a new experience for me, and naturally it helps to understand terms like "squawk," "vector," "heavy" and many others. Fortunately, the **RealATC** manual includes a glossary of ATC and aviation terms that will help you. Also, I found the adventure titled "REALATC CHATTER ONLY" provided a good first experience using **RealATC**. All I needed to do was to sit in my Cessna and listen to the ground traffic talking to the tower and the tower talking back to the ground traffic. I recommend starting with this adventure if you're new to ATC terms and chatter. I expected to hear the same voices and messages each time I loaded



!REALATC CHATTER ONLY is a good first experience using **RealATC**. All I needed to do was to sit in my Cessna and listen to the ground traffic talking to the tower and the tower talking back to the ground traffic.

the “!REALATC CHATTER ONLY” adventure. The surprising part was that, since **RealATC** uses a different set of startup sequencing, it’s unlikely you’ll hear the same chatter each time.

The sound quality ranges from good to excellent. I used the program with both speakers (Altec Lansing) and headphones. The voices were usually very clear using either method (although using headphones did seem to add even more realism). You’ll even hear an occasional crackle or foreign accent. The types of ATC chatter that you’ll hear include receiving and giving commands to *Flight Simulator*’s ground, tower, approach, departure and center facilities at any airport. You’ll hear only the appropriate chatter that corresponds to the part of the flight in which you’re flying.

RealATC also generates random weather

The **RealATC** chatter is impressive, but is not the only reason to consider this program. Another reason I like *RealATC* is that it can generate random weather and includes several adventures that are designed for using random weather. In other words, different types of weather can change at different rates. The weather generated by *RealATC* is very impressive. I could see weather changing as I flew from clear skies into fog. I also hit some unexpected turbulence—including the dreaded wind shear. Even short flights can encounter quick, dramatic weather changes.

Besides the weather adventures, **RealATC** also includes several other adventures and situations. You’ll use most of the situations with the adventures. The situations are “plans” which correspond to the list of adventures. Here, too, it’s helpful to know how to make and create flight plans, but the **RealATC** manual includes several empty Flight Planning sheets you can use.

Boeing 757-200 ER aircraft

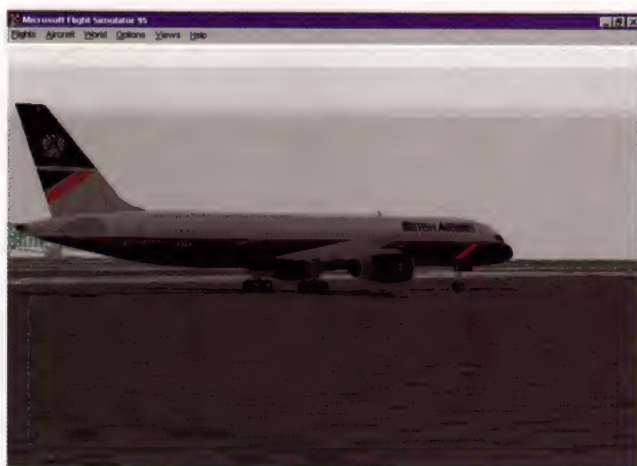
RealATC also includes thirteen Pro Series Boeing 757-200 ER (Extended Range) aircraft that you can fly. Although better aircraft are available in other *Flight Simulator* add-ons, these aircraft are nevertheless designed well and do precisely what they’re supposed to do: fly. Besides, the main reason to buy **RealATC** is for the radio chatter, not the new aircraft. (By the way, the ATC chatter does work with other aircraft from other manufacturers.)

Installation

RealATC is easy to install. Simply insert the CD-ROM and follow the on-screen prompts. Otherwise, installation instructions are explained and illustrated very nicely in the manual.

Also, **RealATC** won’t suck up a lot of hard drive space (30 Meg), but make certain to have enough before you start the installation.

The manual also includes several pages of IATA airport codes, a phonetic alphabet listing, navigation-compass bearing listings and more. I strongly recommend reading the manual before installing—and especially before using—**RealATC**. I found that to be very useful, especially in using the adventures and situations.



Real ATC also includes 13 Pro Series Boeing 757-200 ER aircraft that you can fly.



An example of the cockpit from one of the 13 Pro Series Boeing 757-200 ER included with RealATC



RealATC does require a Sound Blaster-compatible sound card. The aircraft included with *RealATC* are compatible with *Flight Simulator 98*, but you must first use the *FS98 Converter* (available at <http://www.microsoft.com/games/fsim>).

Conclusion

All sim pilots regardless of their skill now have the ability to hear real radio calls and transmissions while flying. You will never want to fly in silence again, as your ears can be treated to loud, rapid fire, stressful and often comical ATC radio chatter, just as heard in real life.

Real ATC

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The Advanced Flight Control System (AFCS) from AETI helps make your flying experience very realistic.

Advanced Flight Control System

Review by Adam Howe

Flight Simulator has made great strides in creating "as real [a flying experience] as it gets" inside your computer. But much of that realism is lost when you're controlling your plane through a computer keyboard or mouse. And how many Cessnas (or any other contemporary, non-military aircraft) have you seen with a joystick? I'm sure the answer is "Not many." Having the right hardware around your computer is the only way to make your experience as real as can be. For that, you'll want the **Advanced Flight Control System (AFCS)**, from AETI.

Using the keyboard with Flight Simulator can be frustrating for many cyberpilots. Press keypad [2] to pull up, [8] to dive, [9] to increase throttle, and so on. Joysticks can improve control, but often don't add a lot of realism. To get the most out of your flight

simulator, you will need the Advanced Flight Control System. This is no ordinary joystick. The AFCS is an actual flight yoke (with optional throttle) that mounts to your desktop.

Assembling the hardware couldn't be easier. Unpack the yoke from AETI and mount it on the desktop near your computer. Mount

the throttle and plug it into the yoke unit, then plug the yoke into your computer. You will need a sound card with a MIDI input or Gameport to receive the yoke.

Sound too easy to be true? I assure you, it is not. After it is plugged in, you only need to add the yoke to Windows and calibrate it to start flying. Adding the yoke to Windows is straightforward—there is no software to install. Double-click the My Computer icon on your desktop and double-click Control Panel. Find the Game Controllers icon and double-click it.

In the Game Controllers window, under the General tab, click the [Add] button.

Select "4-button flight yoke w/ throttle" from the list and click [OK]. Windows should now recognize your new controller.

Now we're ready to calibrate the yoke to insure it behaves like an actual yoke. To begin the calibration, click the [Properties] button, then [Calibrate]. Then just follow the instructions on the screen. The calibration has you test the device's center point (at rest) and the range of motion. The final step is to test the throttle. Click [Apply] and you're done.

You can also calibrate the yoke through Flight Simulator. I used the Advanced Flight Control System with the Microsoft Flight Simulator 6.1 (FS98). To calibrate it, I simply opened Flight Simulator 98 and chose **Custom Controls** from the **Options** menu.

I clicked the [Enable Joystick] button, then [Calibrate]. This opens the same Windows calibration screen as shown above.

Product Reviews



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<http://design-web.com/DesktopWings/>

Having used my fair share of joysticks in my life, from Atari's to Nintendo's to several for the PC, I can say this one is the best available. Not only does it look like an actual flight yoke, it responds like one too. Having the ability to turn gradually in either direction without having to hold down a button, and level the turn without pressing another, is by far the greatest addition to any system with a flight simulator. The control was smooth and reliable. The four buttons on the yoke allow the pilot to adjust the flaps up and down, apply the brakes and lower the landing gear. All the main features used in the flight are available at your fingertips.

Another nice feature is the yoke's mounting. The AFCS has a bracket that slides under your desk or table. The yoke is secured to the surface with two thumb screws, which are rubber capped to prevent damage to the mounting surface. The throttle secures to the mounting surface with one screw, which is also capped. I do suggest you have an edge or lip on the mounting surface, so when you are pulling out of those steep dives, you won't pull the yoke off the desk and find it in your lap.

There are many control devices that you may use to control Flight Simulator aircraft, and everybody has a preference. Many people swear by either the mouse or the keyboard. But few of these people have grabbed hold of AETI's flight yoke. Once they do, they'll wonder how they ever flew with a virtual rodent or 100+ keys.

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Flight Line

Here is a schedule of events related to the aviation world for the months of April through July. If you do not see the event you are interested in, or if you have any specific inquiries or additions, feel free to contact us.

Phone: (616)554-7275
Fax: (616)554-7279
E-mail: tim@ftmagazine.com

Fly-ins and Extravaganzas

April 19-25 Sun 'n Fun 98 Annual Fly-In—Lakeland, FL

Information may be obtained on the Internet at <http://www.sun-n-fun.com/> or by dialing Tel: 941-644-2431 Fax: 941-644-9737

July 27 – August EAA Air Venture and Fly-In—Oshkosh, WI

Information may be obtained on the Internet at <http://www.flyin.org/frame2.html> or by calling 920-235-3007.

Air Shows

April 1998	
04/04	Air Show Luke AFB, Arizona
04/04	Luke Day Airshow Phoenix, Arizona
04/04	Air Show MCAS Beaufort, South Carolina
04/18	ICAS Foundation Airshow of the Stars Kissimmee, Florida
04/18	Air Show MacDill AFB, Florida
04/18	Air Show Barksdale AFB, Louisiana
04/25	Pt. Mugu Airshow Oxnard, California
04/25	Air Show Point Mugu NAWS, California
04/25	Sound of Freedom 98 MCAS New River, Jacksonville, North Carolina
04/25	Shawfest 98 Community Activity Day Shaw AFB, South Carolina
04/25	Lone Star Flight Museum Galveston, Texas
04/25	NAS Norfolk Airshows NAS Norfolk, Virginia

May 1998	
05/02	Shell Air & Sea Show Ft. Lauderdale, Florida
05/02	Dogwood Arts Festival Air Show Knoxville, Tennessee
05/02	Air Affair 98 Airshow & Fly-In Moab, Utah
05/03	RDU Expo Raleigh-Durham, North Carolina
05/09	600 Festival Airshow & Open House Concord, North Carolina
05/09	Airshow Chattanooga Chattanooga, Tennessee
05/09	Air Show San Angelo, Texas
05/13	1998 Greenwood Formation Clinic Greenwood, Mississippi
05/15	DoD Joint Services Open House at Andrews AFB Andrews AFB, Maryland
05/16	Upton Air Show Thomaston, Georgia
05/16	Vance Airshow Enid, Oklahoma
05/16	Montreal Airshow Mirabel, Quebec
05/16	Air Show Fairchild AFB, Washington
05/16	Aerospace 98 Spokane, Washington
05/20	Air Show Annapolis, Maryland
05/21	Salute to Veterans Celebration Jefferson City, Missouri
05/22	Graduation Fly-by Annapolis, Maryland
05/22	We Remember Air Show 98 Memphis, Tennessee
05/23	Salute to Veterans Celebration Columbia, Missouri
05/23	Lehigh Valley Air Show Allentown, Pennsylvania
05/23	Air Show Kelly AFB, Texas
05/24	Air Show NAS Meridian, Mississippi
05/27	Air Show U.S.A.F Academy, Alabama
05/27	Graduation Ceremonies USAF Academy, Colorado
05/29	NAS JRB Ft. Worth Dallas/Fort Worth, Texas
05/30	Air Show Elmendorf AFB, Alaska
05/30	Madera Central Valley Fly-in Madera, California
05/30	Air Show NAS JRB Ft. Worth, Texas
05/31	Air Show Eielson AFB, Alaska

Flight Line

June 1998

06/01	Ville De La Baie International Air Show Ville de la Baie, Quebec
06/05	Wings Over Long Island Westhampton Beach, New York
06/05	Mid-Atlantic Air Museum WWII Weekend Reading, Pennsylvania
06/05	Anti-drug Airshow Huntington, West Virginia
06/06	Idaho Aerofair Boise, Idaho
06/06	Elkhart Airshow Above and Beyond Elkhart, Indiana
06/06	Air Show Coney Island, New York
06/06	Air Show North Kingstown, Rhode Island
06/07	Paso Robles Airshow 1998 Paso Robles, California
06/12	US West Rose Festival Air Show Portland, Oregon
06/13	Blue Ash Airport Days Blue Ash, Ohio
06/13	Air Show Hillsboro, Oregon
06/13	Upward Airshow Eau Claire, Wisconsin
06/19	Aerospace America 98 Oklahoma City, Oklahoma
06/19	Deke Slayton Airfest 98 LaCrosse, Wisconsin
06/20	Camarillo Air Show Camarillo, California
06/20	Air Show Grissom ARB, Peru, Indiana
06/20	1998 Jack B. Poage Airshow Westminster, Maryland
06/20	Santa Fe Air Show Santa Fe, New Mexico
06/25	Mississippi Int'l Balloon Classic & Airshow Greenville, Mississippi
06/27	Airshow Spectacular 98 Bridgeport, Connecticut
06/27	Quad City Air Show Davenport, Iowa
06/27	Thunder Over Niagara Niagara Falls ARS, New York
06/27	Wings Over Venango Franklin, Pennsylvania
06/27	Sound of Freedom Air Show NASJRB Willow Grove, Pennsylvania
06/27	Racine Airshow Racine, Wisconsin

July 1998

07/03	Team US National Hot-Air Balloon Championship & Air Show Battle Creek, Michigan
07/03	Fair St. Louis St. Louis, Missouri
07/03	Firststar Fireworks Milwaukee, Wisconsin
07/04	National Cherry Festival Traverse City, Michigan
07/04	Friendship Festival Airshow Fort Erie, Pennsylvania
07/04	Flyerworks 98 Seattle, Washington
07/04	Tacoma Freedom Fair Tacoma, Washington
07/11	Torrance Air Fair Torrance, California
07/11	Air Show Pensacola Beach, Florida
07/11	Springfield Air Rendezvous Springfield, Illinois
07/11	Gathering of Eagles Airshow and Open House Fort Campbell, Kentucky
07/11	Air Show Plattsburg AFB, New York
07/11	Armed Forces Air Show Wilkes Barre/Scranton, Pennsylvania
07/17	Muskegon Air Fair Muskegon, Michigan
07/17	Great Texas Balloon Race Longview, Texas
07/18	Aviation Expo-98 Van Nuys, California
07/18	United States Air & Trade Show Dayton, Ohio
07/18	Sea n Sky Fest NAS Whidbey Island, Washington
07/18	South Puget Sound Air Show Tumwater, Washington
07/19	Airshow 98 Victoria Victoria, British Columbia
07/22	Air Show Cheyenne, Wyoming
07/24	Selfridge Air National Guard Base 1998 Air Show Selfridge ANGB, Michigan
07/24	Aircraft Past & Present 98 Elyria, Ohio
07/25	Prince George Airshow Prince George, British Columbia
07/25	Warbirds Over Kalamazoo Kalamazoo, Michigan
07/25	Wings Over Batavia Batavia, New York
07/25	Air Show Latrobe, Pennsylvania

Acrobatic Competitions

April 2-4, 1998 - CHANDLER, AZ (CHD)

Copperstate Regional Aerobatic Competition sponsored by IAC Chapter 69. Sportsman through Unlimited. To be held at Chandler Municipal Airport (CHD). Contact Contest Directors George or Jan Norris at PHONE 602/759-5795(H); FAX 602/413-6744; E-MAIL norris@primenet.com.

April 15-18, 1998 - SEBRING, FL (SEF)

36th Sebring Aerobatic Championships sponsored by IAC Chapter 23 and Flugvergngen. Contact Contest Director Mike Mays at 561/734-1955 or Bob Stark at 954/426-1560 ext. 101.

April 17-18, 1998 - ST. FRANCIS, KS (SYF)

"No Frills" Mini Contest, sponsored by IAC Chapter 12. Basic and Sportsman categories to be flown. Contact Contest Director John Blum at 303/469-1000 or e-mail at johnnyblum@aol.com.

April 18-19, 1998 - EDNA, TX

Early Bird Contest sponsored by IAC chapter 25. To be held at Jackson County airport (26R), Edna, TX. Five categories, Basic through Unlimited. Contact Co-Contest Director Leslie Eversole at 713/672-8261 ext. 286 (days), 713/451-9504 (evenings) or e-mail acrohead@nol.net.

May 7-9, 1998 - VICTORVILLE, CA (VCV)

24th Annual Gold Cup Regional, Sponsored by IAC chapter 49, to be held at Victorville, CA. Basic thru Unlimited, and glider. Contact Contest Director Randy Chestnut at 800/777-0707.

May 14-17, 1998 - ORANGE, MA (ORE)

New England Aerobatic Championship, sponsored by IAC Chapter 35 to be held at Orange, MA (ORE). Basic through Unlimited. Contact Contest Director Jim Ward at jimw@orbital.mv.com.

May 14-17, 1998 - EPHRATA, WA (EPH)

Apple Cup '98 sponsored by IAC chapter 67. Five categories, Basic through Unlimited, to be held at Ephrata, Washington (EPH). Contact Contest Directors Jerry and Ann Zabriskie at 360/245-3948 or e-mail zabricj@myhome.net; or contact Co-directors Bob and Joyce Trantina at e-mail Btrantina@aol.com.

May 15-17, 1998 - SILVER CITY, NC

North Carolina Aerobatic Championship, sponsored by IAC Chapter 19. Four categories, Basic through Advanced. To be held at Silver City Airport (5W8). Contact Contest Director Scott Tanner at 919/742-3847 or e-mail tannerav8@aol.com.

May 21-25, 1998 - STERLING, CO

Sponsored by IAC chapter 12. Basic through Unlimited. To be held at Sterling, CO (STK). Contact Contest Director Trent Trucks at 303/497-6333 (days) or 970/223-5099 (evenings).

May 22-24, 1998 - KEYSTONE HEIGHTS, FL (42J)

North Florida Aerobatic Championship. Basic through Unlimited. Sponsored by IAC Chapter 90. Contact Pre-Contest Director Keith Lickteig at 407/805-0258.

May 29-31, 1998 - MAYTOWN, PA

The Pennsylvania Aerobatic Championship, sponsored by IAC Chapter 58. Basic through Unlimited. The contest will be held at the Donegal Springs Airpark (N71). For information contact Chapter President, Larry Bashore PHONE 717/766-3705(H) or 717/233-8711(O).

June 5-7, 1998 - AURORA, IL (ARR)

Heuer Aerobatic Classic, sponsored by IAC Chapter 1, will be held at Aurora Airport (ARR). Basic through Unlimited. Contact Contest Director Mike Maloney at 847/356-4363 (H), e-mail mm@lnd.com; or Dave Monroe at 847/516-4283, e-mail Pitts1DM@aol.com.

June 12-14, 1998 - COLUMBUS, OHIO

Red Roof Inn Ohio Aerobatic Open, Bolton Field Airport (TZR), sponsored by IAC Chapter 34. Powered-categories Basic through Unlimited. Two flights for Basic. For information contact: Brian

Howard, CD: PHONE: 937/434-7395, E-MAIL:

BK@NewAttAero.com; or Russ Sheets, Asst. CD: PHONE: 614/267-7200, E-MAIL: Rsheets@aoc-aes.com

June 19-21, 1998 - SALEM, IL (SLO)

Salem Regional Aerobatic Contest, sponsored by IAC Chapter 61. Five categories. Contest to be held at Salem/Leckrone Airport (SLO). Contact Contest Director John Schwenk at 217/359-3261 or Brent Smith at 309/836-5413.

June 19-21, 1998 - SPRINGFIELD, VT

Green Mountain Aerobatic Contest, sponsored by IAC Chapter 52. Five categories, Basic through Unlimited—power. Contest to be held at Hartness State Airport (VSF). Contact Jeff Seckendorf at 518/587-7407 or e-mail jeff@snaproll.com.

June 26-28, 1998 - LAND 'O LAKES, WI

Land 'O Lakes Open, sponsored by IAC Chapter 106. Five categories plus gliders. To be held at Land 'O Lakes Airport (LNL). Contact Contest Director Tim Barry at 561/624-3000.

June 26-27, 1998 - DENISON, TX (F39) 1998

Lone Star Aerobatic Championships, sponsored by IAC chapter 24. Basic through Unlimited. To be held at Grayson County Airport (F39) (tentative). Contact Contest Director Mike Gallaway at 972/267-0885.

July 26-27, 1998 - SEWARD, NE (SWT)

The Midwest Aerobatic Championships, sponsored by IAC Chapter 80. Basic through Unlimited. To be held at Seward Municipal Airport (SWT) in Seward, NE. Contact Contest Director Ed Bowes at 402/477-2966.

July 3-6, 1998 - JACKSON, MI

The Henry Haigh Challenge, sponsored by IAC Chapter 88. Basic through Unlimited. To be held at Jackson County Airport. Contact Contest Director Greg Panzl at 517/467-7185.

July 10-12, 1998 - KENOSHA, WI (ENW)

Great Lakes Regional Contest, sponsored by IAC Chapter 8. Basic through Unlimited. To be held at Kenosha Airport. Contact Contest Director John Willkomm at 414/694-7355.

July 13-17, 1998 - FOND DU LAC, WI (FLD)

IAC Championships sponsored by IAC. Five categories and U.S. National Aerobatic Glider Championships. Contact Contest Director Bob Branch at 760/789-5741.

Announcing

Full Throttle's Shareware Registration Center

Thousands of flight simmers have discovered and are using many of the great flight sim shareware add-ons and utilities.

Shareware is written by some very talented and dedicated programmers. These programmers devote a tremendous amount of time and effort to writing, maintaining and enhancing their programs. You may not know that most shareware authors do not make a living from their flight sim activities. Instead, they depend on their shareware income to help defray their expenses. In turn, thousands of us willingly pay for their contributions towards making our flight sim experience easier, better, faster and more enjoyable.

Shareware is also a low-cost way to distribute software. You can download the software and try before you buy. If you find that you like the program then you can "register" your purchase by paying a low-cost registration fee. Most shareware authors are more interested in writing programs than in running the "business" end of shareware.

For the convenience of our readers and as a way to promote some very excellent shareware, we've set up the **Full Throttle Shareware Registration Center** to process shareware

registrations *immediately* for these authors. Several well-known shareware authors have already agreed to participate through our Shareware Registration Center.

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616-554-7275
- ➔ Fax our 24-hour Line:
616 554-7275
- ➔ Send e-mail:
sales@ftmagazine.com

We can accept your payment for registration using any of the four major credit cards. For phone orders, our staff will give you a registration number immediately. For fax and e-mail, you'll receive a registration number within two days.

The registrations are then sent to the respective shareware authors who will in turn keep you advised of any future enhancements.

You can see the up-to-date list of participating shareware on our website (www.ftmagazine.com).

Attention Shareware Authors:

If you'd like to participate in the Shareware Registration Center, please contact **Full Throttle**.

Shareware Registration Center



WebWatch

Internet Sites for Simmers

by Adam Howe

Today's journey through the net will take us to four sites that are "must visits" for any flight simmer, whether a novice, a licensed pilot or a 737 Captain.

Regardless of the level of experience you have with flight simulation, there is one thing that everyone looks for: more things to play with!

The following sites contain product reviews and downloads that will help you in your simming hobby.

Microwings

The first destination on our four-leg trip is *Microwings* (<http://www.microwings.com>).



As some of you know, *Microwings* also publishes the *Microwings Magazine*. This site allows you to subscribe to the magazine and informs you of membership discounts available from many companies, as well as technical support and contests. The portion of the Web site that is open to everyone contains articles, press releases, downloads and even two flight simulator-based crossword puzzles (to see how much you *really* know about flight simulation!).

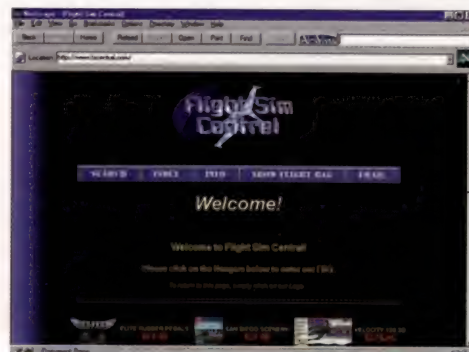
The download portion of the site gives you the opportunity to download a vast collection of aircraft, scenery and numerous freeware and shareware programs, all of which will enhance your flight simulator.

Flight Sim Central

As we prepare to take-off, please notice the exits located at the front of the cabin as well as the rear. If you look out the left side of the plane, you will notice *Flight Sim Central* (<http://www.fscentral.com>).

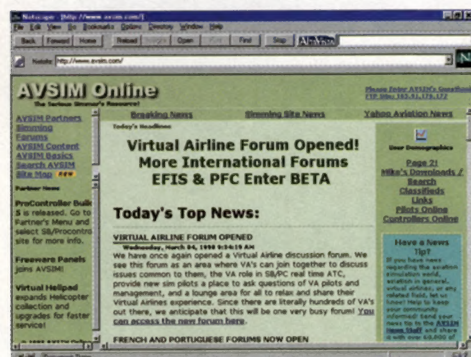
Flight Sim Central is a great place to find add-on software packages for Microsoft's *Flight Simulator*, as well as other flight simulation packages. The site breaks down the software by category. Some of the categories are: New Arrivals, Coming Soon, Accessories, General Aviation, Ground School and Military.

To place an order for any of the vast selections of software, you can contact *Flight Sim Central* through their order line at 1-800-477-7467, fax them at (702) 847-4705 or call their main/international line at (702) 847-9400. As their slogan says, they are "Strapping you in the cockpit of desktop aviation."

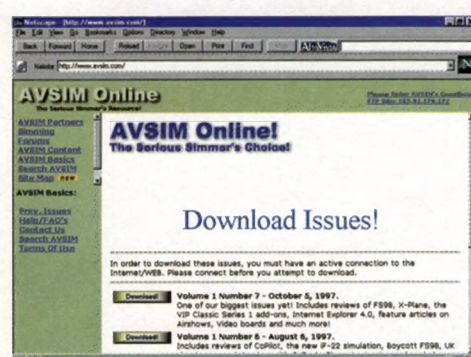
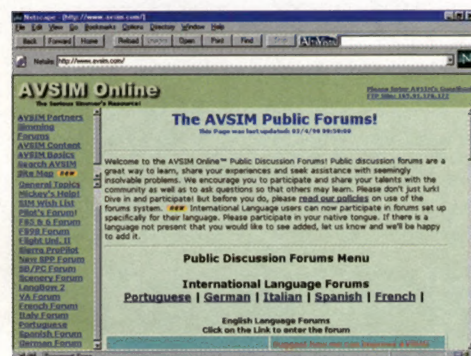


AVSim

Thank you for flying with *Full Throttle* Airlines. Please return your tray to its upright position and set your browser to *AVSim* (<http://www.avsim.com>).



AVSim is an on-line magazine that keeps the flight simulation community up to date on the exciting world of computer aviation. If you are looking for a great source of general flight simulation information, *AVSim* is the place. You can download back issues and check out the various forums, each of which deals with a specialized aspect of flight simulation.



FlightSim.Com

Please remain in your seat until the plane has come to a complete stop, and set your browser to *FlightSim.Com* (<http://www.flightsim.com>).



Like *Microwings*, *FlightSim.Com* requires a membership to access most of the pages on the site. The only difference is that *FlightSim.Com* is free. By entering some basic information about yourself (no credit card information, social security or promise of your first born), you can choose a login name to use each time you visit the site. Once you log on, you can access a variety of pages, including New Announcements, Combat Sims Forum, Reviews, How To and FAQs (my personal favorite), the Developers Spotlight, File Libraries, FS Companies and General Information.

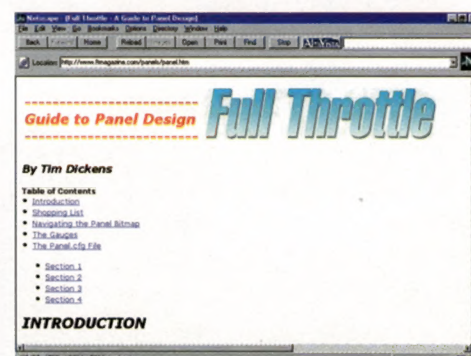


Full Throttle

As you exit the plane and enter the terminal, please be sure to visit the *Full Throttle* Web site (<http://www.ftmagazine.com>).



Check out the new article by the Managing Editor of *Full Throttle* magazine, Tim Dickens, on panel design. The article explains the tools required to build your own panels and steps you through how to assemble them and get them working in Microsoft's *Flight Simulator 98*. While on your visit, be sure to check out the back issues and the other information and files available on the *Full Throttle* Web site.



Once again, thank you for flying, and if you have any suggestions on this article or if you would like to suggest someone's Web site (even your own!) to be mentioned in this article, drop me a line at adam@ftmagazine.com.

"Prepare Yourself For

The rush you're going to get from powering your Lear within feet of a REAL Mt Rainier. The rush you're going to get from exploring the remnant spills of a once angry and REAL Mt St Helens from the vantage point of your cockpit. The rush you're going to get from cruising the entire 50 mile expanse of the REAL Lake Chelan. The rush that you're going to get, period, from flying the most realistic and largest photorealistic scenery expansion ever for Microsoft® Flight Simulator®, the first in the MegaScenery USA 98 series - Pacific North-West USA.

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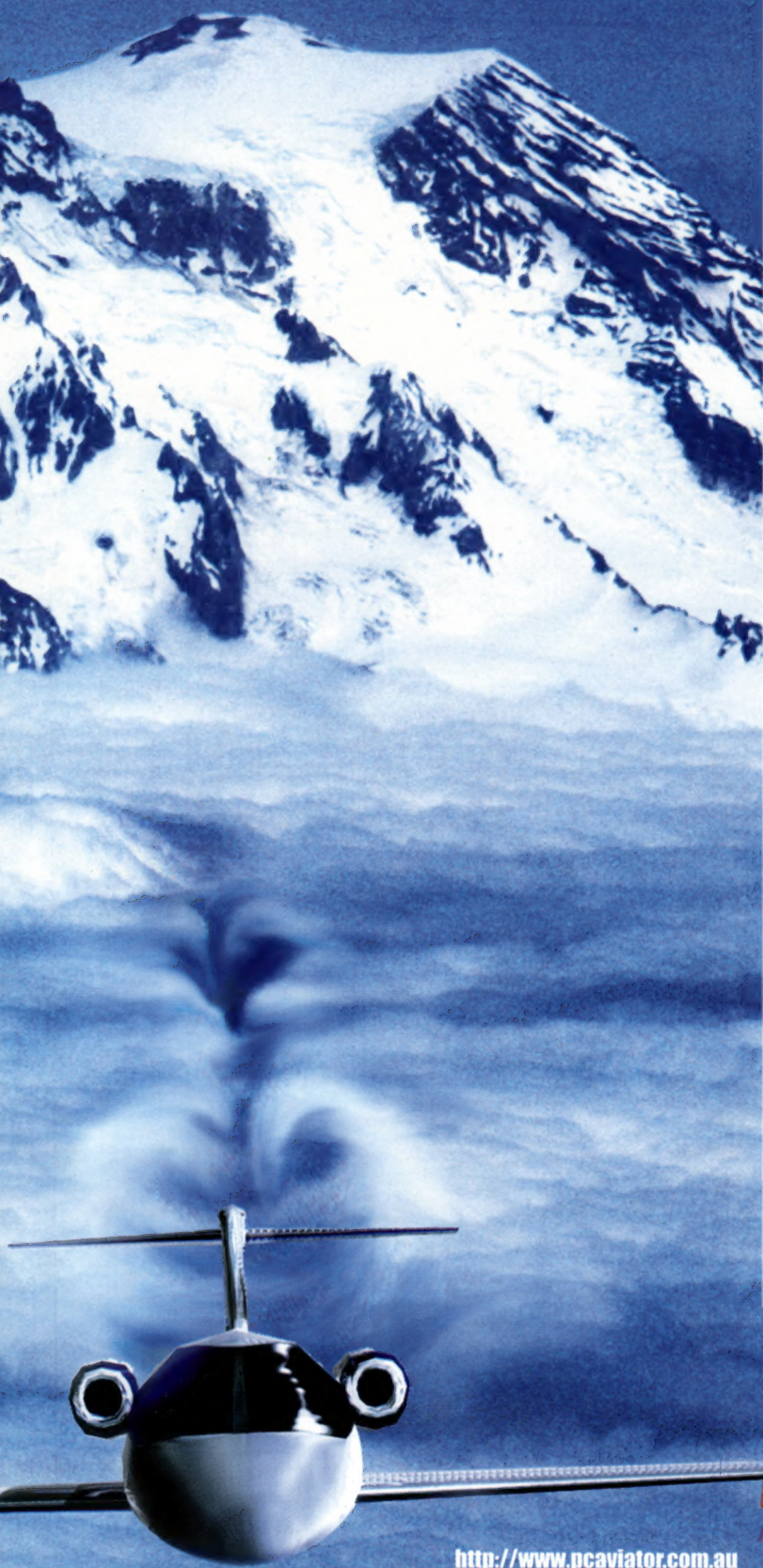
Includes The Cities Of

Seattle • Vancouver • Portland

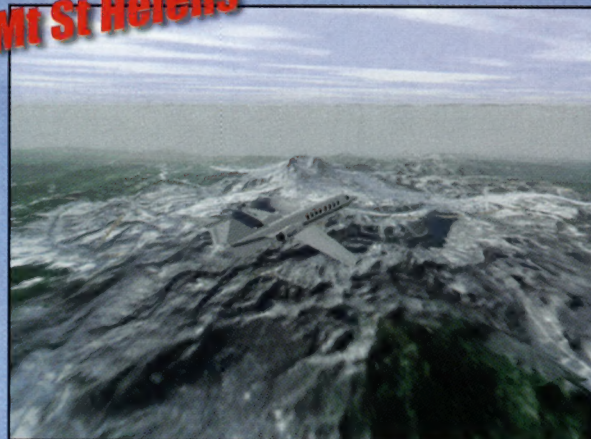
all in never-before-seen photorealistic "rooftop" resolution detail

* Works with Microsoft Flight Simulator V5.1, 95 and Flight Simulator 98

The Rush!"



Mt St Helens



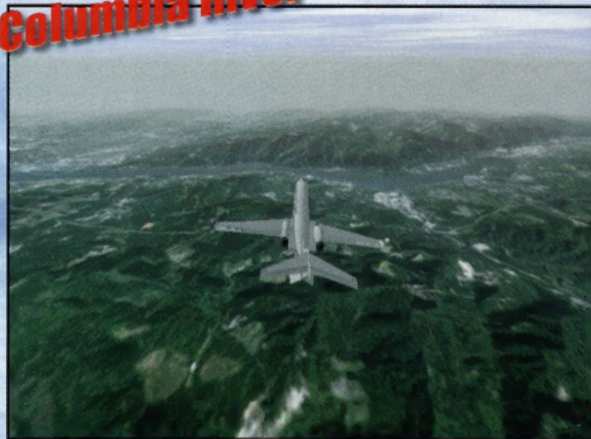
Explore the remnants and debris surrounding Mt St Helens.

Mt Rainier



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Domination!

From the outset, F-22ADF was designed to exploit the benefits of Windows 95 in the gaming environment. Easy set-up, point-and-click GUI and sophisticated on-line help are just a few principle features of this sequel to EF2000. The simulation itself offers new ways for players to access and control the flow of battle, as well as pilot the most advanced operational aircraft ever flown. Perhaps the most stunning aspects of the game are the result of a new terrain and aircraft rendering system. Landscapes will now be available with dramatically different lighting to reflect the changes throughout the day in time and whether. Aircraft are texture mapped, making recognition of low flying aircraft as difficult as it is in real life!

Dominate YOUR skies!



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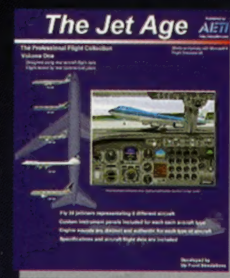
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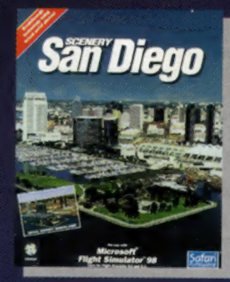
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